

modern castings

DECEMBER, 1956



Owned by

THE MEN WHO BUY

Foundry Layout

12-page special bonus section tells how foundrymen can save time and labor by improving the layout of their plants

Holly and Sand . . .

Christmas story about a foundry supplier's hobby-growing holly

45-Minute Slag Analysis

One chemist can analyze oxides of Si, Ca, Mg and Fe by fast method

Castings for Kids

Chicago's Dowst Mfg. Co. turns out die-cast toys by the million

Choke that Gate

Here's a system that gives good results with copper base alloys

5000 Sq Ft Foundry

Induction melting solves serious space problem at Youngstown plant

Casting White Iron Balls

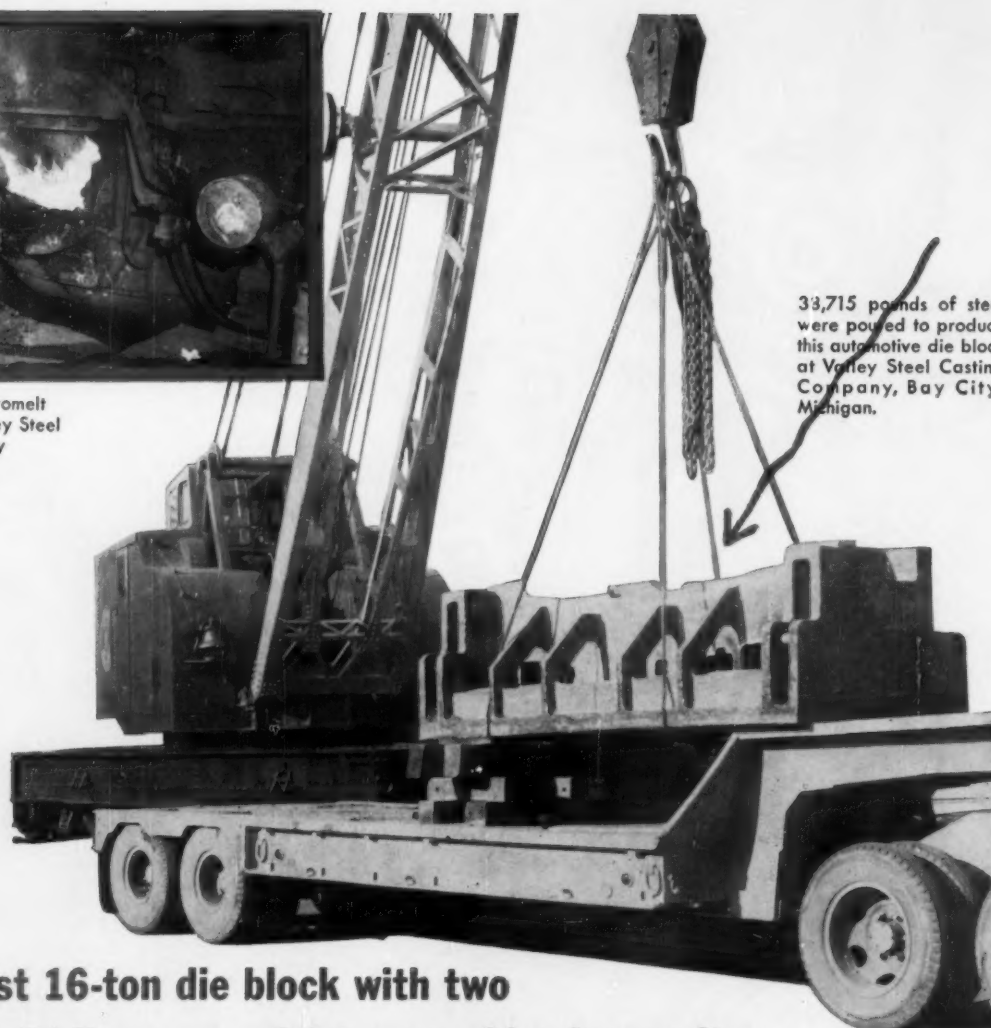
Water cooled permanent molds help Homestake Mine make grinding balls

◆Cover Photo

This is a solar furnace. High atop a building at Caltech, it is used to explore a new frontier in metallurgical knowledge: "Melting Metal With Sun-Power."



One of two Lectromelt
Furnaces at Valley Steel
Casting Company



33,715 pounds of steel
were poured to produce
this automotive die block
at Valley Steel Casting
Company, Bay City,
Michigan.

Cast 16-ton die block with two Lectromelt* Furnaces of 9-ton combined capacity

*One heat was poured from each furnace, with
a touch up heat for the risers.*

Careful planning by Mr. Samuel S. Fair, Plant Manager, and Mr. George W. Barker, Chief Melter, preceded the casting of this block, said to be the largest commercial electric steel casting ever produced in Michigan. Every facility of the melting department had to be coordinated so that both furnaces could be tapped simultaneously and one quickly recharged, so that a "touch up" heat could be melted for the risers.

The Lectromelt Furnaces gave their usual excellent performance—quick turnaround, with top quality steel.

Lectromelt Furnaces are built sturdily to take such pushing for production; you see the results with lower upkeep costs. And while you're crowding on the power, Lectromelt's pinpoint control lets you hold analyses to exacting specifications.

Catalog 9-A describes these furnaces. For a copy, write Lectromelt Furnace Company, 316 32nd Street, Pittsburgh 30, Pennsylvania (a McGraw Electric Company Division).

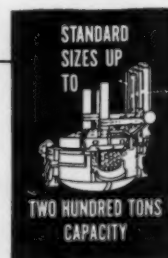
Manufactured in . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . .
BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao
. . . ITALY: Forni Stein, Genoa . . . JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. U. S. PAT. OFF

WHEN YOU MELT...

Lectromelt

CIRCLE NO. 121, PAGE 7-8



future meetings and exhibits

DECEMBER

5-7 . . American Institute of Mining and Metallurgical Engineers, Morrison Hotel, Chicago. Electric Furnace Steel Conference.

10-11 . . Material Handling Institute, Inc., Biltmore Hotel, New York. Annual Meeting.

1957

JANUARY

18 . . Malleable Founders' Society, Hotel Cleveland, Cleveland. Semi-Annual Meeting.

FEBRUARY

4-8 . . American Society for Testing Materials, Benjamin Franklin Hotel, Spring Meeting.

7-8 . . Malleable Founders' Society, Wade Park Manor, Cleveland. Second Technical and Operating Conference.

14-15 . . Wisconsin Regional Conference, Hotel Schroeder, Milwaukee. Sponsored by the Wisconsin Chapter and the University of Wisconsin Student Chapter of the American Foundrymen's Society.

21-22 . . Southeastern Regional Foundry Conference, Dinkler-Tutwiler Hotel, Birmingham, Ala. Sponsored by the Birmingham and Tennessee Chapters and the University of Alabama Student Chapter of the American Foundrymen's Society.

MARCH

11-15 . . Nuclear Congress, Convention Hall, Philadelphia.

13-14 . . Foundry Educational Foundation, Hotel Cleveland, Cleveland. College-Industry Conference.

15-16 . . California Regional Foundry Conference, Claremont Hotel, Berkeley, Calif. Sponsored by the Northern California and Southern California Chapters of the American Foundrymen's Society.

18-19 . . Steel Founders' Society of America, Drake Hotel, Chicago. Annual Meeting.

25-29 . . American Society for Metals, Pan-Pacific Auditorium, Los Angeles. Tenth Western Metal Exposition and Congress.

APRIL

10-11 . . Malleable Founders' Society, Edgewater Beach Hotel, Chicago. Market Development Conference.

12-13 . . East Coast Regional Foundry Conference, Benjamin Franklin Hotel, Philadelphia. Sponsored by the Philadelphia, Metropolitan and Chesapeake Chapters of the American Foundrymen's Society.

MAY

6-10 . . American Foundrymen's Society, Cincinnati. Castings Congress.

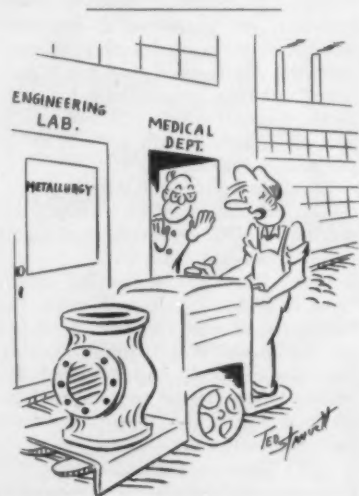
JUNE

13-14 . . Malleable Founders' Society, The Broadmoor, Colorado Springs, Colo. Annual Meeting.

16-21 . . American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J. Annual Meeting.

20-22 . . Penn State Regional Foundry Conference, Penn State University, State University, Pa. Sponsored by the Rochester, Pittsburgh, Metropolitan, Eastern New York, Western New York, Northwestern Pennsylvania, Central New York, Chesapeake and Philadelphia Chapters and the Penn State University Student Chapter of the American Foundrymen's Society and the Reading Foundrymen's Assn. and Conestoga Foundrymen's Assn.

23-25 . . Alloy Casting Institute. The Homestead, Hot Springs, Va. Annual Meeting.



Doc, I have a body here to be x-rayed!

CIRCLE NO. 122, PAGE 7-8



ALCHEMY WON'T WORK ON BENTONITE, either!

During the Middle Ages, alchemists worked in vain to discover the secret of transmuting common metals into gold. Modern day alchemists are no more successful in their efforts to produce a *satisfactory* low-viscosity-bentonite from clays that do not possess this desirable quality. It is true that adding certain chemicals to bentonite will lower its viscosity. But, this "alchemy" also lowers the durability of bentonite, so it burns out faster, losing its ability to develop green and dry bond strength.

Federal uses no "alchemy" in the production of Federal GREEN BOND Bentonite! It doesn't have to — for low viscosity* is a *natural* characteristic of the bentonite clay from which Federal GREEN BOND

is produced. Federal engineers test-drill bentonite deposits *before* mining — select *only* those lots with natural low viscosity for the production of Federal GREEN BOND Bentonite.

Federal GREEN BOND, therefore, is a pure mineral product — *unadulterated, untreated*. And, because it is free of harmful chemicals, its durability is unimpaired, its ability to develop high green and dry strength retained much longer.

So, don't take a chance on "alchemy" — when you can *depend* on Federal GREEN BOND — the best of the bentonites. (Write for your copy of "Tailor-Made Molding Sands".)



The FEDERAL FOUNDRY SUPPLY Co.

4600 EAST 71st STREET
CLEVELAND 5, OHIO



* Federal GREEN BOND's low viscosity enables users to temper sand with less water, yet optimum strength with less molding time, when "dry admixed" to sand. When used as an additive to "slurry", up to 25% more GREEN BOND may be added to the water, to produce a more potent slurry and provide easier control of moisture and sand strength.

AVAILABLE IN PULVERIZED, GRANULAR AND quick-dispersing SLURRY GRADES

NEWS FOR SHELL MOLDERS FROM



New RCI system simplifies cold coating of sand

**May be used for producing shell molds
or shell cores by dump box
or blowing methods**

Now, with the new RCI system, *all you need is two materials* for cold coating sand (besides the sand). One is a powdered phenolic resin, RCI FOUNDRIZ 7555. The other is an alcohol solution of a phenolic resin, RCI FOUNDRIZ 7150.



No longer do you need to purchase and handle alcohol, catalysts, lubricants and so forth.

Amount of resin needed: The amount of resin required for a given mix will, of course, depend on whether you are coating sand for dump-box operation or for blowing shells and cores (and will vary con-

siderably with the type of sand used). But the experience of RCI Technical Service men in the field indicates that for shell cores about 2-4% resin will be satisfactory. For dump-box operations or blown shells a range of 3-5% will generally be enough.

Other Advantages of RCI coating system

- 1. Speed of coating**—release of alcohol from the resin itself accelerates actual coating of the sand. You cut mulling time about 35 to 45% . . . reduce resin dust, too.
- 2. Strength of bond**—because the RCI system coats more efficiently than the powder and alcohol method, you get greater dry tensile strength (on an equal solids basis). You also get better economy and reduced gas content.
- 3. Rate of production**—lowered investment time as well as cure time with this system gives you a higher rate of production for both cores and molds.
- 4. Release characteristics**—you will find a marked improvement in the ease with which cores and molds are released from the boxes and patterns.
- 5. Resin stability**—both the powdered resin, FOUNDRIZ 7555, and the liquid resin, FOUNDRIZ 7150 are very stable. You can store them for long periods of time (the powdered resin kept cool and dry to prevent lumping).

Write for full information. If you would like to know the procedure and typical formulations for simplified cold coating with the new RCI system, write today for *Technical Bulletin F-10*.

Creative Chemistry . . .
Your Partner in Progress



REICHHOLD

Synthetic Resins • Chemical Colors • Industrial Adhesives • Plasticizers
Phenol • Formaldehyde • Glycerine • Phthalic Anhydride • Maleic Anhydride
Sodium Sulfite • Pentaerythritol • Pentachlorophenol • Sulfuric Acid
REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.
CIRCLE NO. 133, PAGE 7-8

Announce High-Heat Alloy

Development of a high-temperature alloy for investment casting has been announced by Haynes Stellite Co., Div., Union Carbide & Carbon Corp. The alloy, GMR-235, was developed with the research laboratories division of General Motors.

This alloy is a nickel-base, high-temperature alloy containing chromium, molybdenum, iron and boron with aluminum and titanium as precipitation-hardening agents. It is produced by two methods, either air-melting or vacuum-melting and was designed for investment-cast turbine wheels, buckets, and vanes for use at temperatures in excess of 1400 F.

It has a higher yield strength than any other production alloy with comparable strength above 1400 F. The alloy also has good room-temperature ductility, a very low strategic alloy content, and is said to exhibit a remarkable resistance to overaging at service temperatures for periods of 1000 hours.

Amateurs May Answer Military Problems

Amateur inventors who have solved many technical problems for the armed services in the past may have the answers to pressing current problems.

In an effort to channel the ideas of inventors, amateur and professional, the National Inventors Council was formed in 1940 as an activity of the U. S. Department of Commerce. The Council publishes a cumulative list of technical problems turned over to it by the military agencies. An inventor who has a proposed solution may submit his idea to the Council which will evaluate it and, if practical, will present it to the proper authority.

"Technical Problems Affecting National Defense" may be obtained by writing to NIC, Department of Commerce, Washington 25, D. C.

More than 200 successful inventions have been processed since the formation of the Council. Included are the World War II mine detector, the mercury cell battery used for walkie talkies, signal mirrors used by downed flyers and many important refueling methods.

Answer questions by sending for data describing the newest products and processes. Order now by using the cards on page 7-8.

december, 1956

vol. 30, no. 6

modern castings

in this issue

Melting Metal with Sun-Power / D. S. Halacy, Jr.	28
Holly and Sand go Hand in Hand / C. R. Wolf	30
A Complete Slag Analysis in 45 Minutes / W. T. Unfried	32
How to Improve Foundry Layout / Roger B. Sinclair	35
Castings for Kids by the Millions / George A. Mott	47
Choke That Gate / Charles V. Knobloch	48
Induction Melting Puts Fabricator Into Gray Iron Production / H. B. Osborn	51
White Iron Castings for a Black Hills Gold Mine / LeRoy Seyhers	52
Foundry Facts—Specifications / Gray Iron	73

regular departments

Future Meetings & Exhibits	The SHAPE of Things /	
Inside Front Cover	H. J. Weber	56
Modern Castings Album	Committees in Action	57
4	For The Asking	58
Products & Processes	Dietrich's Corner	66
6	Local Foundry News	68
Let's Get Personal	Obituaries	72
15	AFS Chapter Meetings	76
Pouring Off The Heat	Classified Advertising	78
21	Advertisers and Their Agencies	80
Editor's Report		
23		
New Books		
24		
Foundry Trade News		
53		

**FOUNDRY TECHNICAL CENTER, Golf & Wolf Roads, Des Plaines, Ill.
Vanderbilt 4-0181**

WM. W. MALONEY, General Manager
CURTIS G. FULLER, Managing Director

JACK H. SCHAUH, Editor
PAUL R. FOGHT, Managing Editor
GEORGE A. MOTT, Assistant Editor

J. M. ECKERT, Advertising Manager

Branch Offices

Cleveland—14805 Detroit Ave.,
Boulevard 2-2423, WM. I. ENGLEHART,
District Manager.

New York—6 East 39th St.,
Murray Hill 5-9450, RICHARD WESTON
District Manager

Associate Editors

S. C. MASSARI, Metallurgical
H. J. WEBER, Safety, Hygiene,
and Air Pollution Control
J. E. FOSTER, Engineering
A. B. SINNETT, Education

MODERN CASTINGS is indexed by Engineering Index, Inc., 29 West 39th St., New York 18, N. Y. and microfilmed by University Microfilms, 313 N. First St., Ann Arbor, Mich.

Published monthly by the American Foundrymen's Society, Inc., Golf & Wolf Roads, Des Plaines, Ill. Subscription price in the U.S., \$5.00 per year; elsewhere, \$7.50. Single Copies 50c. May and June issues \$1.00. Second-class mail privileges authorized at Pontiac, Illinois. Additional entry at Des Plaines, Ill.



On The Management Side

■ How's business? You get all kinds of answers from all kinds of people. Total employment in foundries declined for seven consecutive months through July. Yet it was still above the levels of a year ago in iron and steel foundries though below last year in non-ferrous foundries.

One gets a different picture from looking at the primary metal industries (which include foundries) as a whole. Output rose throughout 1955 and leveled out at near-capacity rates in the first half of the year. Although the figures for more recent months have been distorted by work stoppages in steel, copper and aluminum, September production was at record rates. In August, unfilled orders were higher than a year ago, more than twice the volume of two years ago.

■ Export license bills governing iron and steel scrap exporters have been further simplified by the U.S. Bureau of Foreign Commerce. This Federal action makes export of scrap much easier despite efforts of metals industry groups to persuade the Government to reduce scrap exports. Scrap exports have risen to the point where the total for 1954 and 1955 is believed to equal about half the total tonnage shipped in the previous 54 years, according to National Foundry Association.

■ Col. Willard F. Rockwell, board chairman of the Rockwell Manufacturing Co., told the Pittsburgh Chapter of AFS a few weeks ago that politically motivated metals stockpiling in recent months has forced thousands of small businesses to the brink of bankruptcy. Colonel Rockwell blasted "bureaucrats" of both major political parties. Among his comments were:

■ Government manipulation causes "tidal wave" price fluctuations and terrific inventory and other losses.

■ These losses are mostly to small businesses because big business has been able to protect itself through many wide price swings by long term contracts.

■ In the summer, Government stockpiling created such a shortage of aluminum scrap that secondary aluminum could only be purchased by small foundries at 8 cents above the primary aluminum price.

"But when the Government announced that its aluminum stockpile was complete, the secondary price dropped to its historic position, which is lower than the primary price. Literally thousands of small businessmen had to absorb terrific inventory losses."

■ The nickel stockpiling program is "wicked" and has promoted a gray market with prices 200% higher than normal price. Defense contractors have been encouraged to overestimate their nickel requirements and indulge in "defense profiteering."

(Incidentally, the Government has diverted about 25 million lb of nickel from its stockpile to private industry in this quarter and ODM said it will issue no calls to stockpile nickel during the first quarter of 1957.)

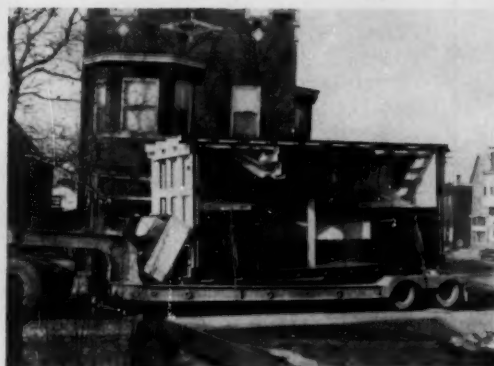
■ Producers of primary metals, of course, are in favor of stockpiling. The Tungsten Institute meeting in Los Angeles in October heard pleas for domestic price supports for tungsten or that the U.S. buy all domestic production.

Better alloyed castings will come from steel melted in electric arc furnaces that use electric currents to stir the molten metal. Such an "induction stirrer mechanism" has been installed at the steel foundry of General Electric's Foundry Dept. in Schenectady, N. Y. Installation of stirring equipment for this 50,000 lb capacity furnace cost \$200,000. A special 250 KVA generator (below) will supply the current to the mechanism. GE has plans for a second installation of the stirrer in the Schenectady steel foundry.



Aerial foundrymen are the boys at Empire Steel Castings, Inc., Reading, Pa. Only foundry in the East with its own plane, Empire has replaced its first aircraft with this new twin-engine Aero Commander. The plane is used to fly Empire's customers to the plant and to deliver rush orders. Here, pilot Bill Firmin checks on the loading of a 398 lb stainless steel casting.

Chicago foundrymen have wanted the industry to know that they can make the big ones, too. Chicago Heights Pattern and Model Works put 5000 board ft of lumber into this pattern and another 6000 ft into the core box. The Continental Foundry and Machine division of Blaw-Knox cast a steam turbine housing with this massive equipment.



modern castings album



Two died and 20 were injured when the administration building of Ampco Metals, Inc., Milwaukee, was blasted apart by the explosion of a boiler in the heating system. More than 100 are employed in the office, but many were out of the building at the time of the blast. Total property damage was estimated at about \$200,000. See *foundry trade news* for additional news of Ampco's activities. *UP Photo.*

U.S.-built foundry equipment on display in Dusseldorf at the International Foundry Trade Fair won the interest of many visitors. Three U.S. firms exhibited: Beardsley & Piper, Shalco Eng. Corp., and Eastern Clay Products. Shown here is the Beardsley & Piper exhibit. This display was in a separate pavilion located alongside the main convention halls. Equipment for both green sand and shell molding was on display in the exhibit.



Foundrymen in Utah Vote to Form AFS Chapter

■ Utah foundrymen meeting in Salt Lake City voted unanimously October 31 to petition the American Foundrymen's Society board of directors for formation of a Utah Chapter of the society, the 46th of the AFS organization and the fourth to be organized during the past 12 months. The new group plans to meet alternately at Salt Lake City and Provo and has petitioned to include Utah, Arizona and southern Idaho in its territory.

A. S. Klopf, American Gilsonite Co., headed the steering committee. He is a past chairman of the Chicago and Wisconsin chapters.

AFS representatives present included C. C. Drake, Griffin Wheel Co., Denver, national director, who described the opportunities and advantages of local foundry meetings, AFS General Manager Wm. W. Maloney, and field membership director D. M. Hayes who outlined the society operations.

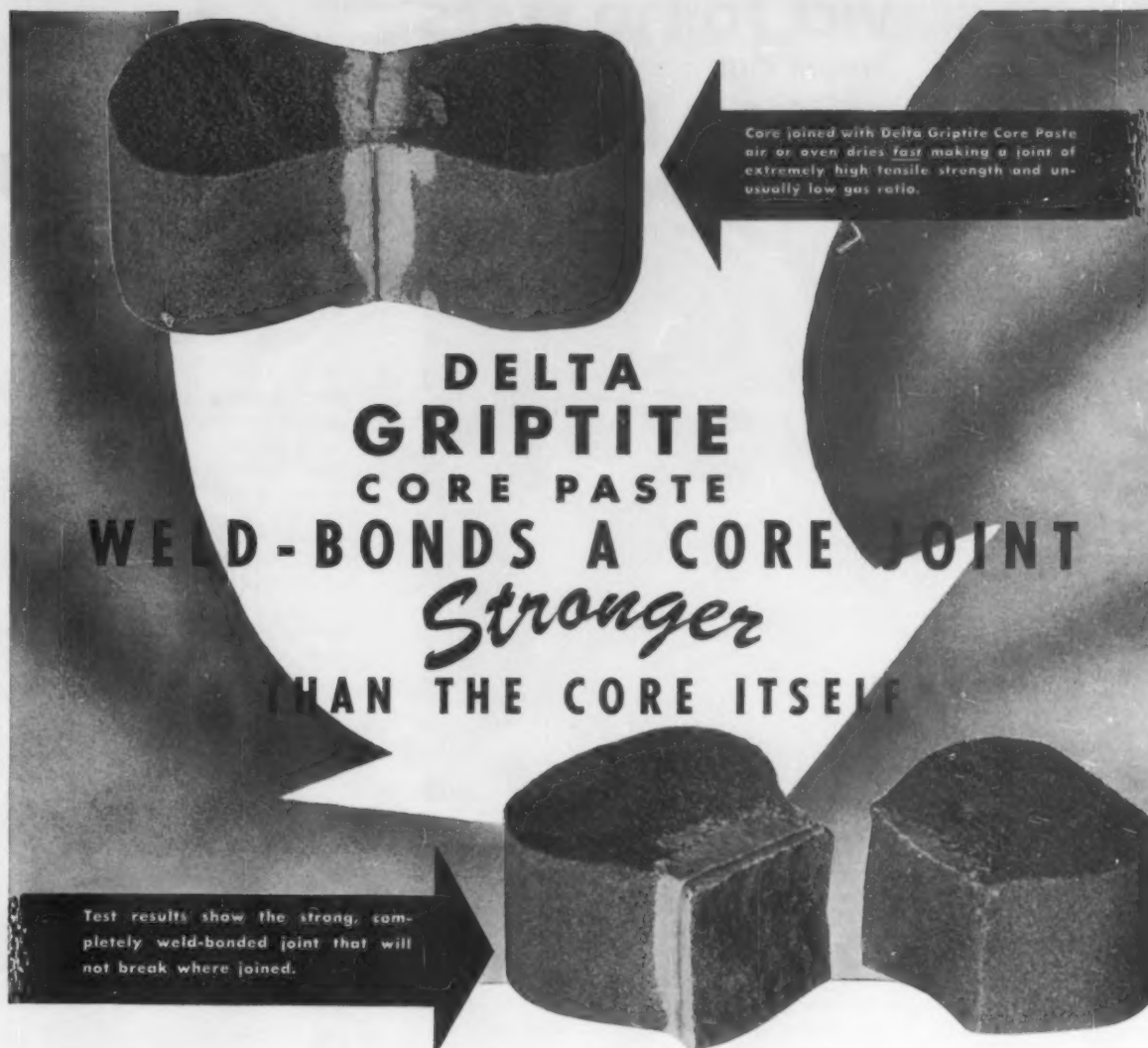
Members of the steering committee in addition to Chairman Klopf included: Everett H. Bachman, Bachman Foundry Co.; Byron R. McKay, Star Brass Foundry & Refining Co.; J. W. Nielson, U.S. Steel Corp.; J. F. May, Lundin & May Foundry Co.; C. C. Cardall, Pacific States Cast Iron Pipe Co.; and J. N. Carter, American Foundry & Machine Co.

Officers and directors elected by the group are: Chairman, A. S. Klopf; 1st vice-chairman, C. C. Cardall; 2nd vice-chairman, D. N. Rosenblatt, American Foundry & Machine Co.; secretary, E. N. Rowe, American Gilsonite Co.; treasurer, Fred Hafen, Pacific States Cast Iron Pipe Co.

Directors nominated: (3 years) J. N. Carter, W. W. Brown, Pacific States Cast Iron Pipe Co.; (2 years) J. W. Nielson, and Byron R. McKay; (1 year) E. H. Bachman, and J. F. May. All officers and directors will serve for the balance of the current fiscal year. Official installation for the new chapter is scheduled for January 21.

Low Temperature Data

Low-temperature properties of metals, compiled in 1952, has been published by the Army Corps of Engineers. "Conference on Materials and Design for Low Temperature Service" though based on information four years old, is said to be one of the few comprehensive collection of material on the subject. Obtainable from OTS, U. S. Dept. of Commerce, Washington 25, 400 pages, price \$10.



Core joined with Delta Griptite Core Paste air or oven dries fast making a joint of extremely high tensile strength and unusually low gas ratio.

**DELTA
GRIPTITE
CORE PASTE**

**WELD-BONDS A CORE JOINT
Stronger
THAN THE CORE ITSELF**

Test results show the strong, completely welded joint that will not break where joined.

New Delta Griptite Core Paste penetrates deep into core surfaces to produce a welded bond of sand many times *stronger* than the core itself. Cores joined with Delta Griptite Core Paste will not break or fracture at the joint.

Delta Griptite Core Paste has a low gas ratio which eliminates the possibility of paste blows. It contains no low fusion materials, is completely stable and is non-reactive with molten metals. It is easy to mix, air or oven dries quickly and, when dry, is resistant to moisture pickup.

Available in 100 lb. paper bags or 400 lb. (net) lined wood barrels.

Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

DELTA

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

**MILWAUKEE 9,
WISCONSIN**

CIRCLE NO. 124, PAGE 7-8

December 1956 • 5

GOOD SERVICE FOR 10 YEARS FROM OUR ERIE HOOK-ON BUCKETS



● STATES W. R. HODDER . . . UNITED ENGINEERING AND FOUNDRY CO.

Ten years ago, United Engineering and Foundry Co. purchased an ERIE Single-Line, Hook-On Bucket. Their requirements were tough, but fair. They needed a durable, smooth-working clamshell to handle slag—a bucket fully controlled by their crane operator, from his cab.

United Foundry now has four ERIE Hook-On's at their Pittsburgh and Vandergrift, Pa. plants. Bucket No. 1 has required little maintenance, still gives fast operation and full payloads. Their other ERIE buckets are doing fine, too. Looking at the record, W. R. Hodder, Chief Plant Engineer, reports: "Our experience with ERIE buckets has been very satisfactory."

Check the ERIE—feature for feature—against any other hook-on clamshell made!

Plus Features of ERIE Buckets

1. Hooks up and is in operation in less than five minutes. Detaches just as quickly.
2. Extra heavy, balanced clams for equal crowding on both closing edges at all times.
3. Narrow, rigid, one-piece welded head shrugs off jars, eliminates wobble, minimizes maintenance.
4. Lever arm and block and tackle design provides great closing power for full payloads.

Write for Catalogs, Dept. M-126

ERIE STRAYER Co.

10126 GEIST ROAD

ERIE, PENNSYLVANIA



CIRCLE NO. 125, PAGE 7-8

6 • modern castings

products and processes

Blast cleaning unit is operated on air line using a variety of abrasives. Total weight is 10 lb. Design provides a housing around area being blasted; within the housing a suction recovers the abrasive used and the contaminated material and dust. *Clementina Ltd.*

CIRCLE NO. 1, PAGE 7-8

Automatic bench vise can open and close up to 2000 times per hour. Locking force varies directly as air



input pressure so that soft pieces can be handled. The main nut and screw of vise is engaged at all times and may be preset to desired opening. *Wilton Tool Mfg. Co., Inc.*

CIRCLE NO. 2, PAGE 7-8

Industrial 35 mm camera has integrated camera and flashholder with 3 and 4 in. reflectors. It has f 3.5



lens and built in range finder and 8 speed shutter range. *Eastman Kodak Co.*

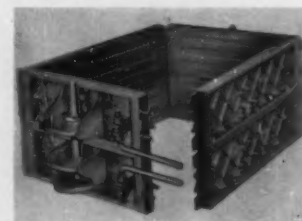
CIRCLE NO. 3, PAGE 7-8

Electric fork truck, 6000 lb, features low silhouette and needs only 6 ft of clearance for operation. Designed for loading closed trucks and trailers.

Steering and controls are automotive type. *Baker-Rauland Co.*

CIRCLE NO. 4, PAGE 7-8

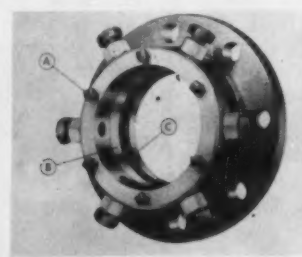
Flasks, straight-wall, Hinge-Off, are recommended for hand and mechanical molding of loose, match plate, and cope and drag plate patterns up to 20 in. in length. Provided with a positive, fast-acting, locking mechanism that aligns and locks open end



rigidly to prevent shift when squeezing. *The Hines Flask Co.*

CIRCLE NO. 5, PAGE 7-8

Pipe flanges may be either bolted in place or welded. They slip over pipe ends, seal off and mate up with standard flange facings. When end thrust screws (A) are tightened the steel thrust ring (B) moves forward



and squeezes the packing ring (C) out between the pipe walls. Available 2 to 12 in. size with standard steel flanges. *The Pipe Line Development Co.*

CIRCLE NO. 6, PAGE 7-8

Aluminum paint capable of withstanding temperatures to 1700 F is

composed of a clear silicone base with a special flake pigment. It air dries in 30 min. and may be applied by brush or spray gun. *Chem Industrial Co.*

CIRCLE NO. 7, PAGE 7-8

Spray penetrating oil in aerosol container offers convenience in can and has ability to reach the inaccessible spots. One can covers about 25 sq ft. *Rothlan Corp.*

CIRCLE NO. 8, PAGE 7-8

Non-destructive testing dye, Zip, is sprayed from pressurized bomb, preferably on a warm surface. Surface defects are outlined in about 90 sec; they develop slightly and then remain constant for hours. Dye may be removed with water. *Saco Laboratories Div., Zip Abrasive Co.*

CIRCLE NO. 9, PAGE 7-8

Vacuum melting furnace for laboratories has maximum operating temperature of 3600 F, melts up to 12 lb of steel. This self-contained unit performs resistance melting, induction melting, annealing, degassing, heat treating, brazing and sintering. *High Vacuum Equipment Corp.*

CIRCLE NO. 10, PAGE 7-8

Steel basket designed for moving castings between heat treat and quench has four lifting hooks for use with crane and a front door for unloading. Basket measures 84 x 60 x 51 in., weighs 2000 lb and handles a work load of 10,000 lb. *Wiretex Mfg. Co., Inc.*

CIRCLE NO. 11, PAGE 7-8

Fire-resistant hydraulic fluids are designed where petroleum fluids present a fire hazard. They are said to have outstanding corrosion and wear resistance. *Carbide and Chemicals Co., Div., Union Carbide & Carbon Corp.*

CIRCLE NO. 12, PAGE 7-8

Electroforming device is said to produce highly precise intricate plastic mold cavities without porosity or surface defects. Reproduces shapes which can't be machined or hobbled. *Powerad Co., Inc.*

CIRCLE NO. 13, PAGE 7-8

Epoxy hardener for use with plastic laminates is used at room temperature. It is said to give excellent toughness and flexibility. Uncured resin has long pot life. *Smooth-On Mfg. Co.*

CIRCLE NO. 14, PAGE 7-8

YES! . . . I want to receive MODERN CASTINGS regularly.

Enter my subscription for one year at \$5.00 in U.S., \$7.50 elsewhere.

☐ Payment is enclosed

☐ Bill me later

Name Position
or Title Important

Address ☐ Home
☐ Business

City Zone State

Company

Subscribe to MODERN CASTINGS

Help yourself to these cards and do yourself a favor. If you don't belong to the American Foundrymen's Society, send in the top card and start to read the most popular magazine in the industry regularly. If you want more information on the products advertised or listed in this issue, send us one of the postage-free reader service cards below and we'll do all the rest.

Send for FREE DATA

Please type or print

56/12

Please have information or bulletins indicated by circled numbers sent to me without obligation.

Name Title

Company

Address

City Zone State

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240

Please use card before June 1, 1957



BUSINESS REPLY CARD

First Class Permit No. 83, Sec. 34.9 P. L. & R. DES PLAINES, ILL.

Reader Service Dept.

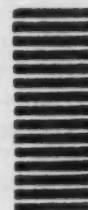
MODERN CASTINGS

Golf & Wolf Roads

Des Plaines, Illinois

**BUSINESS REPLY CARD**

First Class Permit No. 83, Sec. 34.9 P. L. & R. DES PLAINES, ILL.

MODERN CASTINGS**Golf & Wolf Roads****Des Plaines, Illinois****Subscribe to MODERN CASTINGS**

Help yourself to these cards and do yourself a favor. If you don't belong to the American Foundrymen's Society, send in the top card and start to read the most popular magazine in the industry regularly. If you want more information on the products advertised or listed in this issue, send us one of the postage-free reader service cards below and we'll do all the rest.

Send for FREE DATA**BUSINESS REPLY CARD**

First Class Permit No. 83, Sec. 34.9 P. L. & R. DES PLAINES, ILL.

Reader Service Dept.**MODERN CASTINGS****Golf & Wolf Roads****Des Plaines, Illinois**

Please type or print

56/12

Please have information or bulletins indicated by circled numbers sent to me without obligation.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240

Please use card before June 1, 1957

Thermocouple and indicating meter have been combined to indicate surface temperatures with a one-second contact. The dial is calibrated in C & F scales. No batteries or external connections are needed for operating. *Royco Instruments.*

CIRCLE NO. 15, PAGE 7-8

Cloth-filter-type dust collectors are designed for super cleaning ordinary atmospheric air. It is said to have wide usage such as filtering air to compressor intakes and other installations where dust-free air is required. *Wheelabrator Corp.*

CIRCLE NO. 16, PAGE 7-8

Modified constant voltage welders permit a fuller control over a wide range of applications. The line consists of 300, 500, 750 and 1200 amp machines. Main feature is an adjustable slope control that gives a softer arc, eliminates burnback and stubbing and provides a stable, spray-type deposit for aluminum, stainless steel and other alloys. Advantages of are said to be simplified operation, lower installation and power costs and X-ray welds for inert gas, submerged arc, semi-automatic and all metallic-arc automatic welding processes. *Harnischfeger Corp.*

CIRCLE NO. 17, PAGE 7-8

Grinder has built in dust collecting unit with removeable drawer and 4 in. exhaust outlets. Machine available in 12 or 14 in. size with adjustable work rests and spark breakers. *The Standard Electrical Tool Co.*

CIRCLE NO. 18, PAGE 7-8

Exterior wall curtain is suitable for construction of one, two and three story structures. Interlocking split-mullion design provides for horizontal expansion and contraction. Components include insulated panels, operable sash, fixed sash and doors which are factory-assembled and shipped to site complete with all parts. *Kawneer Co.*

CIRCLE NO. 19, PAGE 7-8

Cutting torch is said to be the largest capacity handcutting blowpipe. It will cut risers over 55 in. thick. The torch has separate lines for preheating and cutting oxygen and is designed for use with medium-pressure acetylene but other fuels may be used. *Linde Air Products Div., Union Carbide & Carbon Corp.*

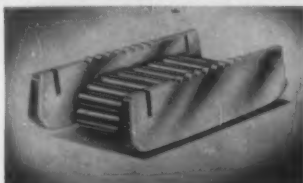
CIRCLE NO. 20, PAGE 7-8

Floor preparation etches and cleans in one operation. Sure-Etch starts bubbling action in 30 sec., opening floor pores. After rinsing and drying

it may be painted. Gallon covers 200-250 sq ft. *Colonial Refining & Chemical Co.*

CIRCLE NO. 21, PAGE 7-8

Heavy machine rollers in five sizes can carry from 2 to 150 tons. The unit consists of a series of moving



rollers locked in an endless track extending above and below a heavy steel frame. Frame has serrated edges which grip and carry the load. *Express Roller Div., Industrial East Co.*

CIRCLE NO. 22, PAGE 7-8

pH meter, pocket-sized, is battery operated and has range from 2 to 12 pH. Flash light batteries are em-



ployed. A single electrode combines both the reference and glass electrodes. *Scientific Div., Beckman Instruments, Inc.*

CIRCLE NO. 23, PAGE 7-8

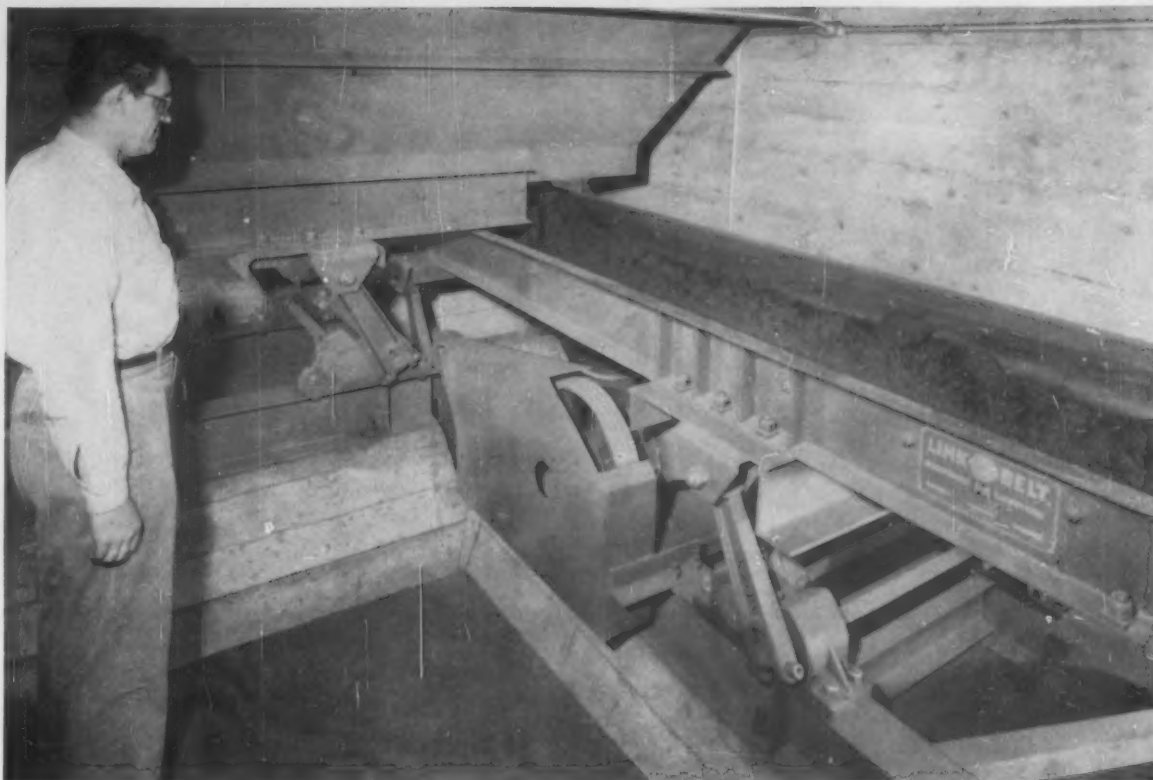
Salamanders which operate on natural or LP gas are equipped with safety shutoff and thermostatic control which returns to pilot operation after reaching temperature. May be



used for construction work heating. Control dial may be located 54 in. from heater. *Insto-Gas Corporation.*

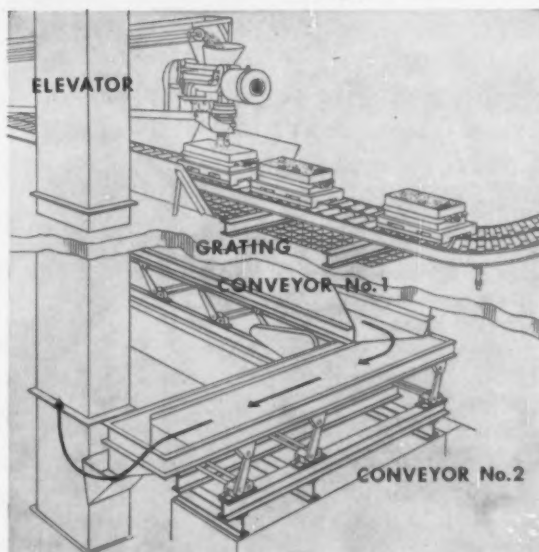
CIRCLE NO. 24, PAGE 7-8

Magnetic grip on safety plexiglas shield allows placing it in difficult positions. The shields come in a va-



PREPARED SAND RECIRCULATING SYSTEM installed at a Milwaukee foundry. Arrangement of Link-Belt oscillating conveyors promotes a clean foundry—eliminates congestion on molding floor.

LINK-BELT oscillating conveyors provide clean molding area with underground sand handling



SPILL FROM SAND SLINGER drops through grating to Link-Belt oscillating conveyors. Sand is conveyed to Link-Belt Bucket elevator for transfer to sand preparation system.

Whether handling spill sand—as shown above—or hot, abrasive sand and castings from shakeout, Link-Belt "PA" oscillating conveyors utilize a gentle but positive action, assuring uniform flow, regardless of load surges. Their compactness offers unmatched layout flexibility. One-piece metal trough with no return run and few moving parts assure minimum operating and maintenance expense . . . keep handling costs down.

For facts on Link-Belt sand handling and preparation equipment, call your nearby Link-Belt office or write for Book 2423. For full data on Positive Action oscillating conveyors—sold from stock in 8-in. to 36-in. widths—get Book 2444.

14,297

LINK-BELT

CONVEYORS AND PREPARATION MACHINERY

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

CIRCLE NO. 126, PAGE 7-8

PAYLOADER®..

works where others can't

What makes a **PAYLOADER®** best for your jobs?

Shortest turning radius

Highest dumping height

Biggest bucket (18 cu. ft. Payload)

Hydraulic-load-shock-absorber

40° bucket tip-back at ground level

Exclusive, one-lever bucket control

Many foundry and metal-working customers tell us that a big advantage of the model HA "PAYLOADER" for their operations is its ability to travel and work where others can't—to negotiate narrow aisles, boxcar doors and corners. Yet this "PAYLOADER" boasts a bigger bucket (18 cu. ft. payload) and can get more, carry more and deliver more tonnage than any tractor-shovel anywhere near its size. An extra plus for any model HA owner is the number of attachments that are available to handle extra jobs—sweeper, fork lift, pusher fork, snow plow.

Owners *expect* more from a "PAYLOADER" and they *get* more because more "PAYLOADER" tractor-shovels have been built and are in service than all other wheeled tractor-shovels put together. There's a "PAYLOADER" size and type to fit *your* needs and a nearby Distributor ready to serve you right.

THE FRANK G. HOUGH CO.

711 SUNNYSIDE AVE., LIBERTYVILLE, ILL.

Send data on "PAYLOADER" tractor-shovels

☐ HA (18 cu. ft.) and HAH (1 cu. yd.)

☐ Larger models to 2 1/4 cu. yd.

Name _____

Title _____

Company _____

Street _____

City _____

State _____

TO _____



PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



riety of sizes and with one or three magnets in base. *Dilley Mfg. Co.*

CIRCLE NO. 25, PAGE 7-8

Hollow shell core blower, 200 Series, is fully automatic and features a swinging head. An exclusive sand feed arrangement delivers sand from main bin to self-feeder hopper and



transfers sand to the tube between blowing cycles. One side of unit is curing while other is blowing cores. *Harrison Machine Co.*

CIRCLE NO. 26, PAGE 7-8

Rust preventative may be mixed with water, oil or solvent or used neat. When mixed with water it produces a non-volatile solution, a safety factor. *E. F. Houghton & Co.*

CIRCLE NO. 27, PAGE 7-8

Drum handler designed for 1000 lb. loads has locking action which clamps



chime of 30 and 55 gal drums. Load is lifted with hydraulic pump and ram. Available with hand-operated one-way 10 gpm pump. *Coolant Equipment Co.*

CIRCLE NO. 28, PAGE 7-8

Self-contained sprayer incorporates a pressured propellant with a separate bottle containing the material to be used. Spray nozzle is adjustable. Propellant is non-toxic and non-

◆ CIRCLE NO. 127, PAGE 7-8

toxic and non-flammable. *Met-L-Chek Western.*

CIRCLE NO. 29, PAGE 7-8

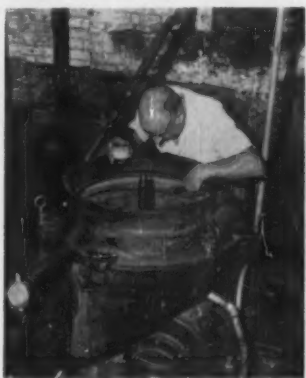
Space heater which is portable produces 70,000 to 140,000 BTUs per hr using $\frac{1}{2}$ to 1 gal of fuel oil. They require no ventilation in rec-



ommended use and may be used as portable space heaters or for permanent, supplementary or spot heating use. A 10 gal filling last 20 hr at normal burning rate or 10 hr at full capacity. *Scheu Products Co.*

CIRCLE NO. 30, PAGE 7-8

Plastic-steel product becomes a steel like mass after hardening two hours. A combination of 80 per cent steel and 20 per cent plastic the material can be worked with regular metal tools. It comes in either a putty or



viscous type. A special hardener is added to the plastic, stir and press or pour into shape. There is said to be practically no shrinkage. *Devcon Corp.*

CIRCLE NO. 31, PAGE 7-8

Stacking baskets made of flat expanded metal on welded steel wire frames have an open mesh construction for quick drainage and easy



He has to see for himself!

Look for
Tru-Steel
in yellow-
striped bag



When it comes to blast cleaning, a foundryman can't believe claims and promises. He has to see for himself the kind of finishing job an abrasive does. His next question is: What does it cost in operation? Different jobs may require different abrasives but the result should always be the same—the best job at *lowest* cost. Malleabrasive and Tru-Steel abrasives give you that. Whichever you need, Pangborn has the right abrasive for your job. Talk to one of our sales engineers, or write PANGBORN CORP., 1300 Pangborn Blvd., Hagerstown, Maryland.

Pangborn DISTRIBUTORS FOR
MALLEABRASIVE® AND
TRU-STEEL SHOT

CIRCLE NO. 135, PAGE 7-8

cleaning. Patented interlock handles give convenient stacking and compact 12 x 20 x 5½ in. *Wire & Iron Products, Inc.*

CIRCLE NO. 32, PAGE 7-8

Wet blast unit is designed to eliminate wire brushing of cast iron and aluminum pistons weighing in range of 42 lb. The pistons are manually loaded on spindles with the entire outside diameter blasted with oscillating guns. Next they are rinsed and finally rust preventative is applied. Unloading is manual. *The Cro-Plate Co., Inc.*

CIRCLE NO. 33, PAGE 7-8

Epoxy resins now have safety hardeners which are non-dermatitic and resistant to high humidities. Line includes steel filled, aluminum filled and mineral filled pastes which cure completely at room temperature with the addition of a hardener. *Furane Plastics, Inc.*

CIRCLE NO. 34, PAGE 7-8

Abrasive cut-off machine, the Radiac, may be mounted on a hand or powered truck. It is designed for dry cutting and uses a rubber bonded abrasive or a resinoid bonded disc. It is suitable for cutting steel tubing or cast iron pipe up to 4 in. o.d. and most solid metals up to 2-5/8 in. o.d. *A. P. De Sanno & Son, Inc.*

CIRCLE NO. 35, PAGE 7-8

Grinding wheels, reinforced with fabric, bonded with resins and made with a depressed center are recommended in foundries for cutting off gates and risers and removing surface defects. One wheel is recommended for steel and steel alloys, another for gray iron, non-ferrous metals and non-metals. *American Emery Wheel Works.*

CIRCLE NO. 36, PAGE 7-8

Boom on low cost truck with a load capacity of 1500 lb at maximum extension of 42 in. and 2500 lb at minimum length of 12 in. allows precision handling of castings, dies and heavy machine tool attachments. Controls allow boom to be positioned within 1/100 in. *Vanguard Engineering.*

CIRCLE NO. 37, PAGE 7-8

Gas burners, RTG series, are designed to produce a long flame for better heat distribution in firing radiant tubes. A primary air adjustment feature permits the burner applica-

CIRCLE NO. 129, PAGE 7-8

HAND CRAFTED CORES



ROTO- BLOWN CORES



SAND SLINGER CORES



at International Harvester

ADM also makes

Indianapolis Foundry*

**all
cores
get**

THE LOGICAL OIL FOR CORES

LINOIL

Archer-Daniels-Midland company

FOUNDRY PRODUCTS DIVISION

2191 WEST 110th STREET, CLEVELAND 2, OHIO

**ARCHER
QUALITY
FOUNDRY
PRODUCTS**



*Photos were taken at International Harvester, Indianapolis Foundry, where the famous truck engines are manufactured. This is only one of 10 Harvester foundries.

INDUCTOL • FREFLO • LINOCEL • LINOSET • ADMIREZ • ADCOSIL

tion to full range of tube sizes and for any industrial gas. *Hauck Manufacturing Co.*

CIRCLE NO. 38, PAGE 7-8

Pressure die casting system providing venting of the die by vacuum before metal injection takes place is available on all sizes and models of line. System is said to give higher density, minimum porosity and better finish. *Kux Machine Co.*

CIRCLE NO. 47, PAGE 7-8

Temperature indicating colors are a series of pigments which assume color characteristics at definite levels. Most colors are permanent so that of test. Heating periods of 30 min. will give accuracy of ± 9 F. *Research Div. Curtiss-Wright Corp.*

CIRCLE NO. 39, PAGE 7-8

Portable bench is mounted on heavy duty casters and allows bench and tools to be taken to the work location. Unit weighs 325 lb and will support 2000 lb. Interior of bench contains shelves and drawers and "plug in" receptacles allow use of electrical tools. *Overbeke-Kain Co.*

CIRCLE NO. 40, PAGE 7-8

Tape dispenser is automatic and air-operated and handles tape widths up to 4 in, lengths to 21 in. When operator removes a length of tape a microswitch automatically sets in motion the next delivery cycle. *Air Fixtures, Inc.*

CIRCLE NO. 41, PAGE 7-8

Radiographic inspection machines, four sizes and portable, have steel penetrating ranges up to 5½ in. Three units are designed for heavy work, the fourth used for spot examinations. They are said to be dustproof, waterproof and shockproof. *Mitchell Radiation Products Corp.*

CIRCLE NO. 42, PAGE 7-8

Rotary abrasive belt grinder which operates wet or dry is designed for o.d. work. It will handle circular parts from 26 to 40 in. dia. Parts are moved across belt face by reciprocating device with a 7-in. oscillation stroke. *Engelberg Huller Co.*

CIRCLE NO. 43, PAGE 7-8

Conveyor features include a bed made of heavy-gauge, heat treated aluminum and a reversible movement of adjustable tension belt. The model comes in eight sizes ranging from 6 to 20 feet. Hinged mounting brackets

CIRCLE NO. 129, PAGE 7-8

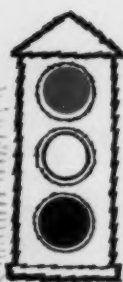
NO STOP

on this Road to Better Castings

Famous
CORNELL
CUPOLA
FLUX

Often Imitated

Never Equalled!



use Famous Cornell Aluminum and Brass Flux

- Makes metal pure and clean.
- Permits use of more scrap without danger of dirt, porous places or spongy spots, due to dirty metal.
- Thinner, yet stronger sections can be poured.
- Metal does not cling to the dross as readily.
- Crucible or furnace linings are kept clean and preserved.
- Cleanses molten brass even when the dirtiest brass turnings are used.
- Saves considerable tin and other metals.
- Forms a perfect covering over the metal during melting, prevents oxidation and reduces obnoxious gases to a great extent.

Write for Bulletin 46-A

Once you use Famous Cornell Cupola Flux you'll see why foundrymen prefer it. This is the one scientifically designed product that greatly increases slag flow off and guarantees complete cleansing of coke (giving carbon constant). Many dollars are saved in cupola maintenance, too, since digging out is greatly reduced. In addition, Famous Cornell Cupola Flux insures less erosion of cupola lining as a vitreous protective surface is formed on brick or stone. Call a Cornell Engineer today or write for Bulletin 46-B.

The CLEVELAND FLUX Company

1026-40 MAIN AVENUE, N. W. • CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass,
Bronze, Aluminum and Ladle Fluxes—Since 1918

CIRCLE NO. 138, PAGE 7-8

14 • modern castings

**FAM
CORNELL
LU KE'S**

Trade Mark Registered

allow unit to be hinged to the wall of a staircase. *Hytrol Conveyor Co.*
CIRCLE NO. 44, PAGE 7-8

Utility torch, oil-burning, may be used for heating, drying, melting, thawing, burning and disinfecting. A safety pressure check has been



incorporated into torch which produces a smokeless 2000 F flame. It is available in two sizes with 4 or 5 gal fuel tank. *Hauck Mfg. Co.*

CIRCLE NO. 45, PAGE 7-8

Precise measuring scale or rule is available up to 12 in. in length. It is subdivided into increments of 0.001 in. The accuracy is said to be 0.0001 in. or better. It is viewed through a simple type of microscope. Two sets of numbers are always in view. *Elliott-Myers Corp.*

CIRCLE NO. 46, PAGE 7-8

Sports Head Injury List

Who are the big ten in sports? You may name the Western Conference schools but to the Du Pont Company the list includes baseball, basketball, swimming, skating, hunting and the other popular participant sports. These common athletic activities accounted for more lost days than injuries in the plant.

Among its 100,000 employees Du Pont found that 515 were injured in sports while only 265 were hurt during working hours. All injuries off the job amounted to 4925.

Baseball headed the accident list with 202, basketball hurt 58 and swimming 43. Volley ball accounted for 11 injuries and hunting 21. Other sports accounted for 83 accidents resulting in loss of at least one day of work.

Du Pont believes that by applying safety rules and regulations to play as well as work that injuries can be substantially reduced.

let's get personal

O. Jay Myers . . has been named vice-president in charge of the foundry division, Reichhold Chemicals Inc., White Plains, N. Y. Formerly technical director of Archer-Daniels-Midland's foundry division, Myers is a vice-president of the American Foundrymen's Society and chairman of its Sand Division.

Frank C. Riecks . . has retired as technical assistant to the manager of foundries for Ford Motor Co. after 40 years' service. He has announced that he will join Sutter Products Co., Detroit, as executive vice-president. Riecks is a past director and honorary life member of the American Foundrymen's Society.

Herman Pneumatic Machine Co. has announced appointment of **L. C. Cairns** as purchasing agent. Also announced is the appointment of **H. H. and H. C. Reich** as exclusive representatives for the firm in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and Tennessee.

G. L. McMillin . . has announced that his organization will be known as Canadian Steel Foundries (1956) Limited. Firm was formerly known as Steel Foundry Div., Canadian Car & Foundry Co. Ltd.

Leo J. Masching . . brass foundry superintendent, Frank Wheatly Pump

& Valve Mfr., Tulsa, Okla., has been recognized by the Tri-State Chapter, AFS, for his 50 years of service in the industry.

The twelve members of the Japan Foundry Industry Productivity Team now touring the U. S. recently visited the Foundry Technical Center, Des Plaines, Ill. Team members are: team leader S. Kawabata, G. Ushiyama, H. Oigo, H. Tsutsumi, I. Suzuki, H. Tamura, K. Miyashita, M. Aoki, G. Fuki, T. Muroya, K. Yoshimoto, and T. Aoki. Following the visit of this group, Hideo Honda, Chuetsu Metal Works, and M. Hamasumi, president of the Castings Institute of Japan, visited the AFS office.

Norman A. Matthews . . former assistant chief metallurgist, materials research and development unit of American Brake Shoe Co., has joined General Electric's metallurgical products department as research engineer.

Foundry Services, Inc., Columbus, Ohio, has named **John E. Gotheridge** technical service manager. New in the same division is **Jack W. Giddens**, technical service engineer.

Theodore W. Bossert . . has been named chief metallurgist of Aluminum Co. of America. He has been assistant chief metallurgist of the firm's metal manufacturing divisions



O. J. Myers



G. L. McMillin



F. C. Riecks

To help you with YOUR ABRASIVE PROBLEMS

Your choice of one or more pieces of literature which shed a light on the complicated problems of blast cleaning abrasives. No tricks, no strings, no obligation!

"A PRIMER ON THE USE OF SHOT AND GRIT"



a 20-page question and answer booklet written *without bias*, from your point of view.

"IT'S TRIPLETS"



a small leaflet that discusses the new look and advantages of palletized abrasives (at no extra cost to you).

"TIRED OF MAKING TESTS?"



This pamphlet suggests a simple control solution of blast cleaning operations. So simple an office boy can operate it—does away with "testing" and never interferes with your operations.

This literature will be sent to you with the compliments of *Controlled T Shot & Grit* and *Perma-brasive Annealed Shot & Grit*—the abrasives that guarantee a savings* in writing and pay off in hard, cold cash money.

*10% in the case of Perma-brasive, 15% in the case of Controlled T

WRITE FOR:

- ☐ "A Primer on the Use of Shot and Grit"
☐ "It's Triplets" (A Story of Palletizing)
☐ "Tired of Making Tests?"



THE NATIONAL METAL ABRASIVE COMPANY
Cleveland, Ohio
THE WESTERN METAL ABRASIVES COMPANY
Chicago Heights, Illinois

SOLD EXCLUSIVELY BY
HICKMAN, WILLIAMS & CO.
(INCORPORATED)

CHICAGO • DETROIT • CINCINNATI • ST. LOUIS • NEW YORK
CLEVELAND • PHILADELPHIA • PITTSBURGH • INDIANAPOLIS

CIRCLE NO. 131, PAGE 7-8

December 1956 • 15

SYMBOL OF PURITY & UNIFORMITY

OREFRACTION

ZIRCON

SAND AND FLOUR

- Domestic and Australian zircon foundry sands
- Zircon foundry flours in 200 and 400 mesh particle sizes

Orefraction Inc.

7432 THOMAS ST., PITTSBURGH 8, PA.

CIRCLE NO. 132, PAGE 7-8

DISTRIBUTED BY

BARKER FOUNDRY SUPPLY CO.,
Los Angeles; San Francisco

HOFFMAN FOUNDRY SUPPLY CO., Cleveland

FREDERIC B. STEVENS, INC., Detroit; Buffalo

PENNSYLVANIA FOUNDRY SUPPLY & SAND CO.,
Philadelphia; New York; New England

M. A. BELL CO., St. Louis; Tulsa; Houston;
Denver; Fred McGee—Chattanooga

FIREBRICK ENGINEERS CO., Milwaukee

LAGRAND INDUSTRIAL SUPPLY CO., Portland, Ore.

FOREMOST FOUNDRY SUPPLY CO., Chicago

EXPORT DEPARTMENT:
1010 Schaff Bldg., Philadelphia, Pa.

FOUNDRY SUPPLY CO. INC.,
Minneapolis; St. Paul

CANADIAN FOUNDRY SUPPLIES & EQUIP. CO., INC.,
Montreal; E. Maritimes

CANADIAN HANSON & VAN WINKLE CO., LTD.,
F. B. Stevens Division, Windsor; Toronto

since 1951. Bossert joined Alcoa in 1923 as a member of the technical direction bureau at New Kensington, Pa.

William J. White . . former vice-president of Shallway Corp., has been appointed plant manager for Carver Foundry, Inc., Fairview Village, Pa.

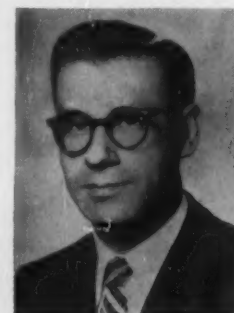


A. C. Quist

Alfred C. Quist . . is now vice-president of E. J. Machine & Pattern Corp., West Springfield, Mass., an affiliate of Production Pattern and Foundry Co., Chicopee, Mass.

Archer-Daniels-Midland Co. has announced these appointments: Julian A. Terpenning has been made technical service engineer and will cover eastern Pennsylvania and Maryland, replacing Lancaster Foundry Supply Co. Joseph Hekler has been appointed sales representative in Central Michigan.

George M. Hartley . . has been appointed manager of marketing for General Electric's metallurgical products department.



H. Rosenthal

Hyman Rosenthal . . has been appointed director of research for Arwood Precision Casting Corp., New York.

Charles E. Gouin . . has resigned from Sorel Industries Ltd., Sorel, Que., to return to American Manga-

nese Steel Div., American Brake Shoe Co., Chicago Heights, Ill. Gouin is a director of the Eastern Canada Chapter of AFS.

Robert E. Woods, Jr. . . has joined St. Louis Coke & Foundry Supply Co. He is the third generation of his family to enter the firm which was founded in 1874.



J. Wright

Joseph Wright . . is now with the foundry division of Magnet Cove Barium as eastern foundry sales representative.

Belle City Malleable Iron, Racine Steel Castings Co., Racine, Wis., has reelected the following officers: Judson F. Stone, chairman; Charles S. Anderson, president and secretary; Ransom J. Swartout, vice-president and assistant secretary.

Harold C. Wagner and Thorald C. Alexander have new positions with Zirconium Corp. of America, Solon, Ohio. Wagner is now technical director and Alexander is chief engineer.



C. H. Beverly

Carl H. Beverly . . has been named treasurer of the Fanner Mfg. Co., Cleveland.

Clinton Walton . . president of Walton Foundry Co., Iola, Kansas, has received a pin from the Tri-State

They've really got flexibility at Greenlee

A CASE STUDY at Greenlee Brothers foundry at Rockford, Illinois, reveals the methods this outstanding plant has used to attain top flexibility. In their machine tool foundry, as many as 120 patterns are handled each day and flexibility is essential. Two Motive Sandslingers, working back-to-back on the same track, ram all of the large pit and flask molds. Smaller, mounted and loose pattern work is rammed by a Stationary Sandslinger. No matter how many patterns are handled, there's never a slowdown for changes.

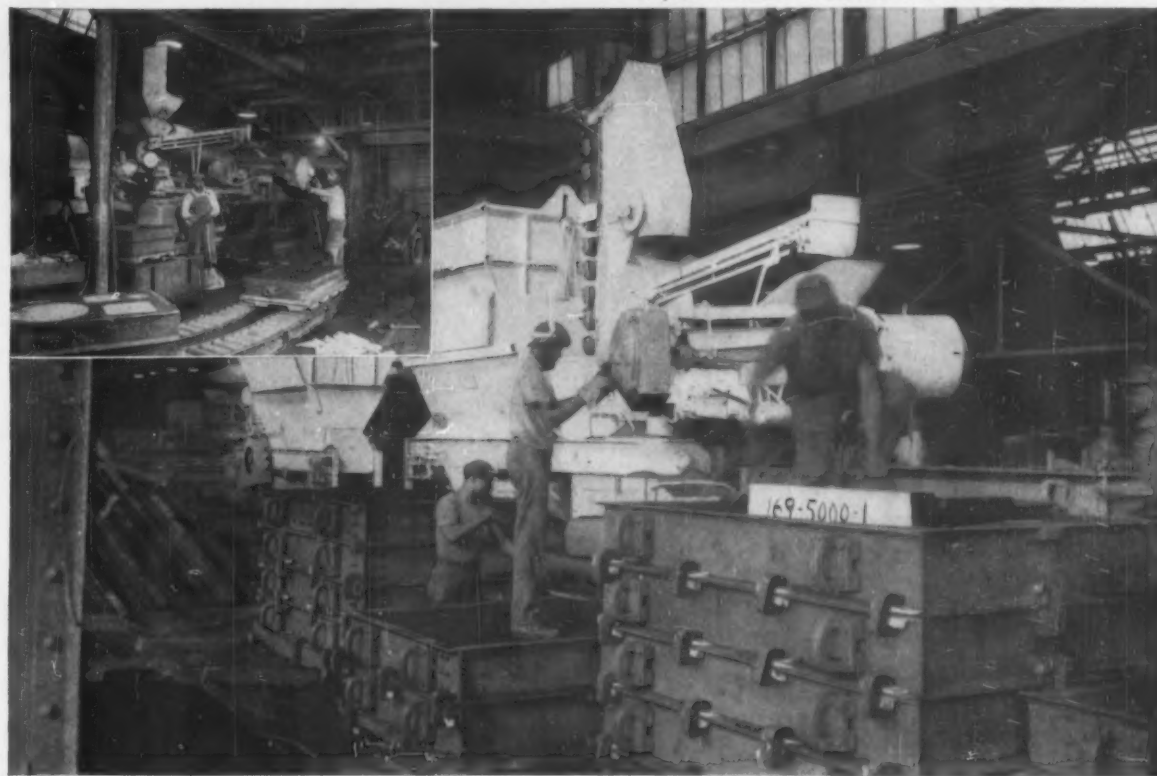
No other method of ramming equals the slinger for flexibility and there's a slinger designed for every job.

In Greenlee's production foundry, where a continuous, completely uniform supply of fully mulled sand is essential, the foundry depends on a Speedmullor for all molding sand for 23 floors. The complete story of Greenlee operations is told in November **BETTER METHODS**. If you haven't received your copy, send for one today.

Beardsley & Piper, Div. Pettibone Mulliken Corporation, 2424 N. Cicero Avenue, Chicago 39, Illinois.

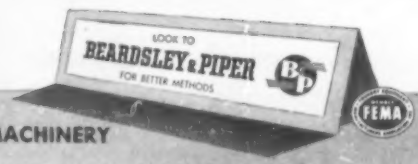


ONE '70' SPEEDMULLOR uniformly prepares all of the molding sand for 23 floors. Bonding additions are only half those required with one of Greenlee's conventional mixers.



TWO MOTIVE SANDSLINGERS provide complete flexibility for Greenlee's large pit and flask work, while up to 70 different loose and mounted patterns are rammed by the Stationary Sandslinger each day.

THE WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF FOUNDRY MACHINERY



CIRCLE NO. 130, PAGE 7-8

December 1956 • 17

ROYER presents... Magna-San



a new SAND CONDITIONING unit with magnetic separation

Magna-San is another new addition to the Royer Line of Sand Conditioning Equipment. This compact and highly portable machine is designed for any foundry, large or small, where sand heaps are conditioned right on the shake-out floor. Designed for front end loader feeding, this unit can heap or windrow magnetically cleaned and Royer mixed, blended and aerated sand as fast as a loader can be positioned for discharge. The "Magna-San way" is faster and easier than hand shovelling and at a lower equipment investment than any other mechanical method yet devised for conditioning foundry sand.

Magna-San is available in two models, the portable RMP as pictured above and the stationary RMS. Write for further details on our new low-cost method of cleaning and conditioning your sand.

features:

- 1 Magnetically cleaned sand at 45 tons/hr.
- 2 Royer mixing, blending, and aeration
- 3 Hopper feeding from 3 sides
- 4 Long discharge stream for piling or windrowing
- 5 Compact—only 90" long x 60" wide
- 6 Easily portable—6½' radius of turn, large wheels and bearings
- 7 Rugged construction

Foremost in Sand

ROYER

Conditioning Equipment

ROYER FOUNDRY & MACHINE CO.

155 PRINGLE ST.
KINGSTON, PA.

CIRCLE NO. 140, PAGE 7-8

Chapter of AFS recognizing his 50 years in the foundry business.

Edward C. Peterson . . has been elected vice-president, Rolling Mill Equipment division, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

John Stobbs . . has been promoted to administrative manager of the Products, Inc., Cleveland.



J. G. Schaeffer

John G. Schaeffer . . has been appointed manager of manufacturing of the Oakland foundry of General Metals Corp., San Francisco.

Thomas G. Digges . . has been appointed assistant chief of the Metallurgy Division, National Bureau of Standards, Washington.

John Hunt . . has moved from Dominion Engineering Ltd. to join Canadian Bronze Co., Ltd. as industrial engineer. He is a past chairman of the Eastern Canada Chapter, AFS.



T. W. Fredericks

Todd W. Fredericks . . has been named general sales manager, Cent-O-Cast & Eng. Co., Detroit.

Charles G. Chisholm . . has been appointed general sales manager, Haynes Stellite Co.

Two General Electric Co. foundry department managers are now tour-

ing Europe. A. E. Blake and J. T. Coggin are now studying European techniques.

Symington-Gould Corp., Depew, N. Y., has appointed Geoffrey Lyford as safety director and has named James Ewing as medical and sanitation supervisor.

James K. Sprinkle . . has joined the Applied Research and Development lab of General Electric's Foundry Department.

H. Chapman Rose . . former Under Secretary of the Treasury has been elected to the board of directors of Basic Incorporated.

J. J. Punke . . has been named executive vice-president of the Precision Castings division of Harsco Corp., Syracuse, N. Y.

Arthur E. Hills . . has been named northern Ohio representative for Hit-chiner Mfg. Co., West Hartford, Conn., die and investment caster.

Kits Available for Making Castings in the Basement

Tired of production line castings and want to do some precision work on your own? Then become a do it yourself hobbyist. A Kansas manufacturer advertises three kits with capacities up to 6 lb castings for less than \$50 each. Either two-part sand molds or the lost wax processes are used.

Each of the three sets has the same equipment and is designed for operation on natural, manufactured or LP gas. The small motor blower operates on 110 ac or dc current. The equipment consists of a gas furnace and blower, fire clay crucibles, tongs, molding flasks, foundry graphite, molding sand, refractory lid, insulating lid and parting compound.

The smallest set is designed for castings up to 1½ lb with a crucible capacity of 6 cu. in., the second set handles up to 3 lb and the crucibles have a capacity of 12 cu in., the largest handles up to 6 lb with the crucibles each having a capacity of 24 cu in.

Patterns can be made from many objects around the house or from molding clay. Junk yards are a good source of metal.

BENTONITE as you like it!

Black Hills 80 . Granular; produced to the lowest possible dust level to eliminate loss at the muller. For maximum efficiency with systems which include fines-removal equipment.

Black Hills Slurry Grade. Coarser than our 80-fineness grade; recommended for rapid dispersion and maximum efficiency in water when clay is added to sand as a slurry.

BLACK HILLS BENTONITE pulverized or 200-mesh. Selected by foundries generally for rapid mulling. Strong, uniform, dependable.

BLACK HILLS BENTONITE



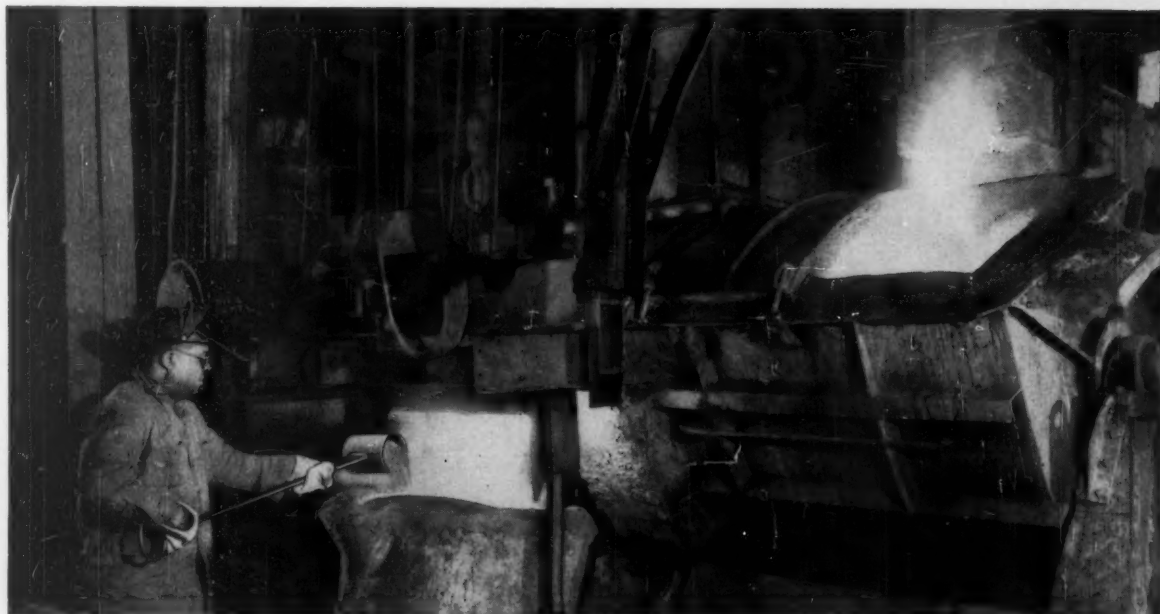
EASTERN CLAY PRODUCTS DEPT.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago, 6

DIXIE BOND • BLACK HILLS BENTONITE • REVIVO BOND • PLASTI BOND • REVIVO CORE PASTE • CUPOLINOR • CUPOLINE • TACCONE MOLDING MACHINES
CIRCLE NO. 134, PAGE 7-8

December 1956 • 19



ELECTROMET Supplies the Iron Foundry with Alloys for all Purposes

ELECTROMET offers you ladle or cupola addition agents for any of your foundry needs. Additions of ferro-alloys will adjust the composition of the base iron to make it suitable for the particular work on hand. You can reduce chill in thin-sectioned castings or improve strength and machinability. You can, if desired, increase hardness and improve resistance to wear and heat—all through simple additions of alloys. There is a wide variety of ELECTROMET alloys from which to choose.

ELECTROMET not only has the alloys to meet your needs, but also furnishes technical assistance in their use. Please phone or write the ELECTROMET office nearest you for detailed information on these or other ELECTROMET products.

ELECTRO METALLURGICAL COMPANY

A Division of Union Carbide and Carbon Corporation
30 East 42nd Street **UCC** New York 17, N. Y.

OFFICES: Birmingham • Chicago • Cleveland • Detroit • Houston
Los Angeles • Phillipsburg, N. J. • Pittsburgh • San Francisco

In Canada: Electro Metallurgical Company, Division
of Union Carbide Canada Limited, Welland, Ontario

The terms "Electromet", "EM" and "SMZ" are registered
trade-marks of Union Carbide and Carbon Corporation.

ALLOYS FOR LADLE ADDITIONS

Ferrosilicons (50%, 75%, 85%, and 90%)

In grades and sizes suitable for all conditions in the iron foundry. Silicon reduces chill in thin-section gray iron castings.

"SMZ" Alloy — A strong, super-graphitizing alloy and chill reducer. Contains zirconium and manganese to enhance the inoculating properties.

Calcium-Silicon—Inoculant for reduction of chill and for developing high-tensile strength. Especially suited for use in low carbon-equivalent irons.

Zirconium Alloys (12 to 15% and 35 to 40%)
Graphitizers for reducing chill, aiding machinability, and improving tensile properties.

Ferrochromium Alloys — Available in many grades for cast iron. All grades have rapid solubility. Widely used to improve the hardness, strength, and heat and wear resistance of cast iron.

Ferrovandium — ELECTROMET foundry grade ferrovandium has good solubility. Vanadium improves toughness.

FOR CUPOLA ADDITIONS

"EM" Briquets—For adding chromium, manganese, silicon or zirconium to cast iron. "EM" briquets are scientifically designed for maximum alloy recovery in cupola melting.

Equipment Manufacturers Check Industry Progress

■ Over 120 members and guests of the Foundry Equipment Manufacturers Association gathered at the Greenbrier, White Sulphur Springs, W. Va., October 18-20 for their 38th Annual Meeting.

Competitors became compatriots in their desire to assist each other in problems basic to their industry.

The highlight of the meeting came when Rex Jennings, foundry supt., John Deere Waterloo Tractor Works,



Rex Jennings

the guest of honor, told the members "What the Foundry Expects of the Equipment Manufacturers".

Speaking from a background of 30 years experience, Jennings told them to build their equipment "rugged", intelligently analyze the customers needs, reduce gadgets, and sell the man who has to supervise the job.

According to the speaker, by 1965 demand for castings will be up 40 per cent while the labor force will increase only 14 per cent.

President D. E. Davidson presided over the business meeting. According to C. R. "Pete" Heller, executive sec.-treas. of FEMA, the association has grown from 25 members in 1919 to 59 member companies in 1956. The meeting was unique this year in that the representatives of the following trade associations were invited to attend: Foundry Facings Manufacturers Assoc., Steel Founders' Society of America, National Foundry Assoc., Malleable Founders Society, and the Gray Iron Founders Society.

Einar Borch presented two reports comparing business trends of the equipment manufacturers with that of the national economy.

C. V. Nass submitted a progress report on the Foundation's activities. According to his report the value of facilities in College Foundries have increased from \$1,034,000 in 1947 to \$2,444,250 in 1956.

Activities of the National Castings Council were summarized by Frank Steinebach.



**pouring
off
the heat**

its not all in the patent

■ In the September issue of MODERN CASTINGS I noticed that you reviewed my Patent No. 2,734,818, covering a method for melting stainless steel in a direct-fired reverberatory furnace. I would like to emphasize the importance of heating the refractory of the entire hearth to 3000 F in order to tap the metal out at 2800 +F. To attain these temperatures one must have the proper combustion equipment, arrangement and operation.

CARL G. DE LAVAL
Mt. Lebanon, Pa.

improving public relations

■ My highest praise to MODERN CASTINGS for the manner in which you handled the story "Training Future Foundrymen in Portland". The publication of this item will do much toward furthering good community relations for both the Oregon AFS Chapter and Electric Steel Foundry Co.

BILL WALKINS
Editor, The ESCO Ladle

difference of opinion

■ I noticed an advertisement in the July edition of MODERN CASTINGS for the Australian magazine "Castings" which claimed that it is the only foundry journal in Australia with a complete coverage of the foundry industry. That, of course, is very incorrect. It has a circulation of barely 1,000 while the circulation of our journal, "Modern Foundry" is over 4,000.

BILL GIBSON
Gibson Engineering (Sales) Pty. Ltd.
Sydney, Australia

Well they say if it weren't for difference of opinion there wouldn't be any horse-races. Perhaps the basis for this argument arises from the fact that "Modern Foundry" is published three times a year while "Castings" comes out twelve times. On the basis of total annual circulation it looks like a photo-finish with 12,000 each!—EDITOR

CIRCLE NO. 123, PAGE 7-8



a good turn for large metal patterns

This big Bullard Turning Lathe is an unusual piece of equipment to be found in a pattern shop . . . its normal habitat is the production line where volume output offsets its investment. At City Pattern it is used to machine

large metal patterns because it provides accuracy at maximum economy of time and money.

This is another indication of the unusual facilities to be found at City Pattern Foundry & Machine Co. for the crafting of the finest in metal patterns and other foundry equipment. Such facilities, manned by experienced hands, are your assurance that a pattern bearing this name has been produced accurately and by the most practical and economical modern methods. These "stand-out" facilities, coupled with conscientious effort to produce the best in patterns, are the very reasons that leading manufacturers rely on City Pattern Foundry & Machine Company for patterns that stand out in use.



City Pattern Foundry & Machine Company's Shrinkage Conversion Tables save time and eliminate errors in shrinkage calculations. Your letterhead request will bring a set of these handy tables without obligation.

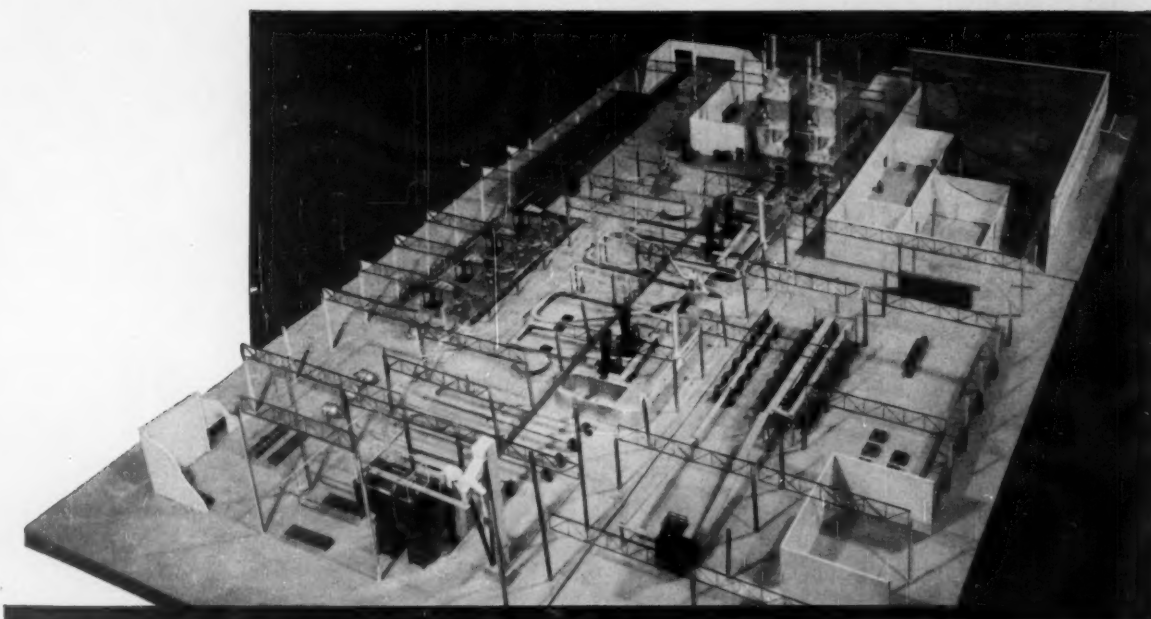


Setting the Pattern
in Patterns

CITY PATTERN

FOUNDRY AND MACHINE CO.

1161 HARPER AVENUE • DETROIT 11, MICHIGAN



Knight services include:

- Foundry Engineering
- Architectural Engineering
- Construction Management
- Organization
- Management
- Industrial Engineering
- Wage Incentives
- Cost Control
- Standard Costs
- Flexible Budgeting
- Production Control
- Modernization
- Mechanization
- Methods
- Materials Handling
- Automation
- Survey of Facilities

AUTOMATION, SEMI-AUTOMATION, MECHANIZATION are a "must"

for profitable operation today of the Production and Production Jobbing Foundry

This model is a proposed modernization of an existing brass foundry. Operations are automated, semi-automated, and mechanized to a high degree to insure maximum productivity per man hour, with total production up to 12,000 tons of castings per year with a balanced 2-shift operation.

A reduction of approximately 55% is anticipated in man hours per ton of good castings, from new materials to finished castings ready for the machine shop. Working conditions are to be improved and more efficient controls of melting, sand, pouring, cores, and other variables should permit high quality castings with a minimum of scrap.

This program resulted from a survey of Knight Engineers with client personnel to determine, for this problem, the most modern technological improvements and new materials, methods, and controls that could be economically justified. Knight Engineers have made hundreds of surveys in all types, classes, and sizes of foundries to assist their clients to reduce costs, improve quality, working conditions, and financial return to workers, management, and owners.

Write for Knight Bulletin No 101, "Professional Foundry Engineering."

Lester B. Knight & Associates, Inc.

Management, Industrial and Architectural Engineers
MEMBER OF THE ASSOCIATION OF CONSULTING MANAGEMENT ENGINEERS, INC.
349 W. Randolph St., Chicago 6, Ill.

917 Fifteenth St., N.W., Washington, D.C.
New York Office—Lester B. Knight & Associates, 375 Fifth Ave., New York City 16

CIRCLE NO. 159, PAGE 7-8

Metals Show at Cleveland Draws Crowd of 68,000

■ Cleveland claimed the title of metal center of the world during the week October 8-12 when the 38th National Metal Exposition was in progress in Public Hall. This annual activity of the American Society of Metals attracted over 68,000 guests.

The 1956 show was presented under the direction of Alfred O. Schaefer, Midvale-Heppenstall Co., Philadelphia, retiring president of the society. The technical papers and the



Dr. D. S. Clark

exhibitor's displays at the show indicate that the future of metals has already outstripped present needs of the earth-bound, and the metals industry is now preparing for space travel, according to Schaefer.

New ASM president is Dr. Donald S. Clark, professor of mechanical engineering at California Institute of Technology. G. MacDonald Young, Aluminum Co. of Canada, Montreal, was named vice-president. W. H. Eisenman was re-elected as national secretary, and Dr. Clarence H. Lorig, Battelle Memorial Institute, Columbus, Ohio, remains as treasurer.

Seven leaders in the metals field were honored with ASM medals.

Edgar H. Dix, Jr., Aluminum Co. of America, was presented the Albert Sauveur Achievement Award for work in aluminum alloys research.

W. H. Eisenman, national secretary of ASM, was chosen for the ASM Gold Medal.

Charles M. White, board chairman of Republic Steel Corp., was given the ASM Research Medal.

Three scientists shared in the Henry Marion Howe Medal Award. Dr. A. R. Troiane, Case Institute; Dr. W. J. Barnett, General Electric Co.; and Dr. R. P. Frohberg, North American Aviation Corp. shared in the award for their joint paper on "Delayed Failure and Hydrogen Embrittlement in Steel."

Dr. Ernest P. Nippes, Rensselaer Polytechnic Institute, Troy, N. Y., was given ASM's Teaching Award.



the editor's field report

by *Jack Schaeum*

◆ **Encouraging Foundry Safety:** During a recent visit to Albion Malleable Iron Co., George Mott, our Technical Writer, learned about an interesting plan for encouraging plant safety. It seems the plant puts up a valuable prize—such as a TV set or shotgun—to be awarded each month by a drawing. However, only members of accident-free departments are eligible to have their names “in the hat” for the drawing. Another approach to safety comes from the Crouse-Hinds Co. in Syracuse. Any employee who has been saved from a serious eye injury by wearing safety glasses receives a certificate of membership in the Wise Owl Club of America and two Wise Owl pins. Your company can adopt such a program by contacting the National Society for the Prevention of Blindness. If you know of a good approach to stimulating safe practices in the foundry why not write me a short letter describing your plan.

◆ **Hydraulic Fluid Fires:** Many serious devastating fires are occurring when flammable petroleum-base oils from ruptured hydraulic lines are ignited by sparks, molten metal, flames, or hot surfaces. Increased automation, higher working pressures, and growing uses for hydraulic controls have only served to augment this hazard. Fortunately this fire-breathing dragon has been slain by the Chemical Industry with their invention of fire-resistant hydraulic fluids, known as “hydrolubes” and “phosphate esters”. Foundries, die casters, heat treaters, and others can substitute these new fluids in their hydraulic systems and save lives, cut insurance costs, prevent property damage, and avoid production losses resulting from fires.

◆ **Precision Steel Castings for Aircraft Use:** What next, now that the Panel on Precision Steel Aircraft Castings has recommended that the Government should sponsor and subsidize a broad program for utilization of steel castings in aircraft? On a recent trip to Washington, I asked this same question of John Garrett, Chief Metallurgist in the Office of the Asst. Secretary of

Defense, Research and Development. According to Garrett nothing startling has happened as yet. The Navy Dept. would like to see his office guide an integrated program of the three services. The Air Force is in the process of overhauling its castings research program with the recommendations of this Panel in mind. The Dept. of the Army plans no drastic changes in its activities. And as Garrett points out the \$300,000 a year recommended for expenditure on foundry controls and techniques, mold materials and castings alloys has to come from somewhere.

◆ **Air Pollution Ordinance in Vancouver:** When our Technical Director, Sil Massari, visited the Vancouver AFS Chapter recently he found the old gang feeling pretty low. And for good reason, because the City Fathers had just enacted an Air Pollution Ordinance, largely patterned after the almost-impossible-to-comply-with Los Angeles law. Faced with these unreasonable regulations, effective January 1, the foundrymen have appealed to AFS for assistance in filing an appeal to modify the Ordinance. Herb Weber, AFS Air Pollution Expert, left immediately by plane for British Columbia to review the Ordinance and prepare an appeal to the city officials. It is unfortunate that AFS was not called on for advisory assistance earlier. Experience has proven that the time to reason with officials is before, not after an Ordinance has been passed. Don't let this happen to you! Call on your National Headquarters for assistance early. That's what we're here for.

◆ **Melting Metal With Sunshine:** Just as irrigation has turned the desert into an agricultural paradise so might the focusing of unlimited kilowatts of sunlight into a furnace spawn a new industrial movement into areas with a clear, hot, dry climate. Already solar furnaces capable of melting over 200 lb of steel are in operation and larger ones to come. For more details on the possibilities of this unusual development read this issue of MODERN CASTINGS.



Here's why Edco Bottom Boards are constructed of Magnesium Alloy

Because of these specific advantages:

- light weight; lighter than wood, metal, steel, iron—and aluminum Bottom Boards too.
- won't break with rough handling—use your Edco Dowmetal Bottom Boards over and over again . . . they're permanent equipment.
- minimum heat retention due to great heat conductivity and radiation which results in rapid cooling.
- increase scrap savings by helping to produce castings true to pattern.

Wood Bottom Boards char, warp, burn easily. Metal boards are heavy; steel boards are unwieldy, costly to handle. Iron boards (even heavier than steel) crack or break if suddenly heated or cooled. Aluminum boards are difficult to clean, often crack because of abuse. And cemented Asbestos-type plates will break at corners and edges. The expense of an under-structure is often required too.

For safe, easy-to-handle, permanent equipment in your foundry, remember this fact: each of the 83 standard Edco sizes is constructed of magnesium alloy. Call Edco next time you need “the right Bottom Board.”

Write for your free copy of the New Facts File. There's no obligation.

CHRISTIANSEN CORPORATION

210 S. Marion Street • Oak Park 2, Illinois
Phones: MA 6-7330 or EU 3-5050



EDCO DOWMETAL BOTTOM BOARDS
EDCO ALUMINUM CORE PLATES

Please send Facts File including list of 83 standard sizes available from stock.

Name _____

Company _____

Address _____

City-Zone-State _____

CIRCLE NO. 139, PAGE 7-8

December 1956 • 23

new books

Elevated Temperature Properties of Coppers and Copper-Base Alloys (ASTM Special Technical Publication No. 181) . . Prepared by C. Upthegrove and H. L. Burghoff. 244 pp. American Society for Testing Materials, 1956. \$5.50.

Data for coppers are limited to wrought materials, but data for alloys apply to cast and wrought materials. Graphical data includes modulus of elasticity, tensile strength, yield strength, reduction of area, elongation, stress for creep rates of 0.000001, 0.00001, and 0.0001 per cent per hour and stresses for rupture in 100, 1000, 10,000 and 100,000 hr.

Powder Metallurgy . . Report of the Technical Assistance Mission No. 141. 309 pp. Published by European Productivity Agency of the Organization for European Economic Co-Operation, 1955. Available from O.E.E.C. Publications Office, 2000 P street, N.W., Washington 6, D.C. \$3.

Report of the Powder Metallurgy Mission, comprised of twenty-eight members representing seven European countries—Belgium, Denmark, France, Germany, Italy, Netherlands, United Kingdom. Mission was split into four groups based upon technical interest: I. Electrical and magnetic materials, II. Hard Metals, III. Refractory Materials, IV. Engineering powders and structural parts. Report summarizes findings of group after visits to forty-three plants and research laboratories. This should be a very worthwhile publication to anyone interested in the subject of powder metallurgy.

ASTM Standards on Light Metals and Alloys, Cast and Wrought . . 3rd ed. 276 pp., American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa., 1955, \$3.50 to non-members, \$2.65 to members.

Aluminum and Aluminum Alloys, Magnesium and Magnesium Alloys, Cast and Wrought. Standards include ingots, castings, bars, rods, wire, forgings, pipe and tube, sheet and plate, wrought products for electrical purposes filler metal, electroplating, and general methods of test. ASTM codification system for light metals and alloys.

The Mechanics of Engineering Soils (2nd ed.) P. Leonard Capper and W. Fisher Cessie, 315 pp. McGraw-Hill Publishing Company, 330 West 42nd St., New York 36, N.Y. 1954, \$6.50.

A revision of the book written in 1948 to gather together the known facts and theories of soil mechanics. The sections on shearing resistance, bearing capacity, pavement design and flow nets have been rewritten and a new section on soil suc-

YELLOWSTONE

BENTONITE

**for the best
casting results**

When you really want the best casting results Yellowstone Bentonite is your answer. Complete uniformity is guaranteed because Yellowstone is 100% pure Wyoming bentonite. Due to selective mining, there is a stockpile of 200,000 tons of the finest colloidal bentonite and this bentonite is processed in the world's most modern bentonite plant at Greybull, Wyoming.

Test after test proves Yellowstone Bentonite to have greater green strength and higher permeability. Because of this great strength and superior bonding characteristics, only small amounts of Yellowstone Bentonite and water are needed to temper.

Ask your distributor for Yellowstone Western Foundry Bentonite.

TYPICAL CHEMICAL ANALYSIS OF YELLOWSTONE WESTERN BENTONITE:

	%		%
Moisture	6.64	CaO	0.64
Combined Water	5.90	MgO	1.53
SiO ₂	59.92	Na ₂ O	2.06
Al ₂ O ₃	19.78	K ₂ O	0.57
Fe ₂ O ₃	2.96	pH in water suspension	9.2



MAGNET COVE BARIUM CORPORATION

ONE OF THE DRESSER INDUSTRIES

HOUSTON, TEXAS

tion has been added. Chapters include: Definition and scope of soil mechanics; Classification of soils; Soil moisture; Compressibility and consolidation; Shearing resistance; Earth pressure; Stability of slopes; Stability of foundations; Settlement of foundations; Pile foundations; Roads and runways; Drainage problems; Site exploration, sampling and testing.

Basic Effects of Environment on the Strength, Scaling, and Embrittlement of Metals at High Temperatures . . 114 pp. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa., 1955, \$2.75.

Symposium sponsored by General Research Panel of the ASTM-ASME Joint Committee on Effect of Temperature on the Properties of Metals. Data on oxidation and surface effects and creep under controlled conditions.

Powder Metallurgy—Now (New Techniques, Improved Properties, Wider Use) . . F. V. Lenel, 34 pp., American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa., 1955, \$1.50.

Fourth Gillett Memorial Lecture in which author discusses and evaluates some of the developments in powder metallurgy since World War II. 32 references.

Development of Improved Titanium-Base Alloys . . Herbert A. Robinson, W. Maxwell Parris, Paul D. Frost, 96 pp. Office of Technical Services, U. S. Department of Commerce, Washington 25, D.C. PB 111988, 1955, \$2.75.

Results of research designed I. To investigate the properties of new alloys having compositions different from that of the Ti-3Mn-complex alloy, II. To investigate fully the effects of hydrogen on the tensile properties, especially ductility, of the Ti-3Mn-complex alloy, III. To evaluate in further detail the properties of the Ti-3Mn-complex alloy, particularly with respect to elevated-temperature strength and stability.

Magnesium Fabricating and Casting . . Report of the Technical Assistance Mission No. 4. 83 p. Published by European Productivity Agency of The Organization for European Economic Co-Operation. 1956. Available from O.E.E.C. Publications Office, 2000 P Street, N.W., Washington 6, D.C. \$1.25.

Details of U.S. Production and Use of Magnesium and Its Alloys. Comparisons of some European and U.S. methods. This should be a very useful report to those interested in magnesium.

Panel Discussion on Pyrometric Practices (ASTM Special Technical Publication No. 178) . . 78 pp. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. 1956. \$1.50 to non-members; \$1.15 to members.

Panel discusses work in defining the precision of temperature measurement and control which can be recommended or specified in high-temperature test work and is concerned with ASTM recommended practices on high-temperature



LITHIUM METAL

by the

GRAM or TON

Nearly a decade of experience producing Lithium Metal commercially is at the beck and call of the non-ferrous foundryman. Lithium is decidedly no stranger to this important, fast-growing industry. A unique element serving many unique purposes, Lithium's affinity for oxygen has for years been utilized to reduce porosity in copper and copper alloy castings. The result is a dense, oxygen-free electrical conductivity casting. Of yet further benefit is the amount of Lithium used as compared with the amount of end-product made. In the degasification, deoxidation and desulfurization of metals, for example, as little as 0.005% or 2¼ grams of Metallic Lithium make a sounder, more uniform non-ferrous casting. Cost, then, can also be a relatively insignificant factor. Put Lithium to work for you. Our banks of electrolytic cells can supply experimental grams or commercial tons of this admirably versatile metal. Write for details of actual foundry tests.

... trends ahead in industrial applications for lithium



**LITHIUM CORPORATION
OF AMERICA, INC.**
2605 RAND TOWER, MINNEAPOLIS 2, MINN.

PROCESSORS OF LITHIUM METAL • METAL DERIVATIVES: Amide • Hydride
SALTS: Bromide • Carbonate • Chloride • Hydroxide • SPECIAL COMPOUNDS:
Aluminate • Borate • Borosilicate • Cobaltite • Manganite • Molybdate • Silicate
Titanate • Zirconate • Zirconium Silicate

BRANCH SALES OFFICES: New York • Pittsburgh • Chicago • MINES: Keystone, Custer, Hill City, South Dakota • Bessemer City, North Carolina • Cat Lake, Manitoba • Amos Area, Quebec • PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minn.

CIRCLE NO. 155, PAGE 7-8

December 1956 • 25

testing of metals E 21, E 22, and E 85. Papers included are: "Thermocouple Immersion Errors," by J. M. Berry and D. L. Martin; "Summary of Pyrometric Procedure Employed by One Company in Creep-Rupture Testing and an Analysis of Results Obtained," by W. E. Leyda; and "Creep and Rupture Test Pyrometry," by C. R. Wilks.

Symposium on Atmospheric Corrosion of Non-Ferrous Metals (ASTM Special Technical Publication No. 175) . . 158 pp. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. 1956, \$2.75 to non-members; \$2 to members.

Reports of tests conducted on 24 wrought alloys of zinc, nickel, copper, lead, tin, and aluminum. About 9000 test specimens were exposed at nine different localities across the country and evaluated after 1, 3, 6, 10, and 20 years. Nine papers discuss the significance of these results in each metals field.

ASTM Standards on Copper and Copper Alloys . . 654 pp. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. Dec. 1955, \$5.75 to non-members, \$4.40 to members.

Compilation of all ASTM Standards on copper and copper alloys, cast and wrought, and related standards developed by committees on wires for electrical conductors and non-ferrous metals and alloys. Includes 127 ASTM Standards—110 specs, 12 test methods, 2 recommended practices, 2 classifications and 1 definition of terms. Fifty of the specs have been revised and a new spec for threadless copper pipe has been added since the previous edition.

Symposium on Metallic Materials for Service at Temperatures Above 1600 F (ASTM Special Technical Publication No. 174) . . 193 pp. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. 1956. \$3.50 to non-members, \$2.65 to members.

Symposium, sponsored by the General Research Panel of the ASTM-ASME Joint Committee on Effect of Temperature on the Properties of Metals, attempts to provide a basis of evaluation of a number of metallic materials, including cermets, which have been undergoing study in laboratories both here and abroad, to determine their suitability for higher temperature service. Papers discuss as many as possible of the properties—physical, chemical, and mechanical—as well as methods of combating surface deterioration that are affected by temperature.

NANCY EDDY, Librarian
American Foundrymen's Society

MORE FACTS on all products, literature, and services shown in the advertisements and listed in Products & Processes and in For the Asking can be obtained by using the handy Reader Service cards, pages 7-8.

COLEMAN OVENS

Only COLEMAN offers a complete line of foundry ovens with all these advantages

RECIRCULATING HEATING OR DIELECTRIC SYSTEMS to meet your requirement best.

DEPENDABLE BAKING AND DRYING. Coleman Ovens remove all uncertainties in core baking and mold drying. Rejects and make-overs are eliminated.

INCREASED LABOR SAVING. Efficient and modern mechanical designs reduce handling and other indirect labor to a minimum.

HEAVY DUTY CONSTRUCTION. Responsible for dependable performance, economical operation, and minimum maintenance cost under rugged service requirements.

MAXIMUM FUEL ECONOMY. Coleman Heating Systems use the most economical fuel available to you — gas, oil, stoker-coal, electricity, etc.

FLEXIBILITY AND ACCURATE CONTROL to bake oil or resin binders — whichever is most satisfactory for your requirements.

BETTER WORKING CONDITIONS. Positive ventilation built into Coleman Ovens prevents leakage of fumes and gases — helps to make the core department a good place to work.

ADVANCED OVEN "KNOW-HOW". Coleman Engineers have pioneered and developed the most efficient oven designs to meet the highly specialized needs of modern foundry methods in all classes of work.

WIDEST EXPERIENCE. Gained through more than half a century of specialization in foundry ovens and the building of over 11,000 successful Coleman Oven installations.

Among the leading machine tool and machinery castings foundries using Coleman Ovens are firms such as:

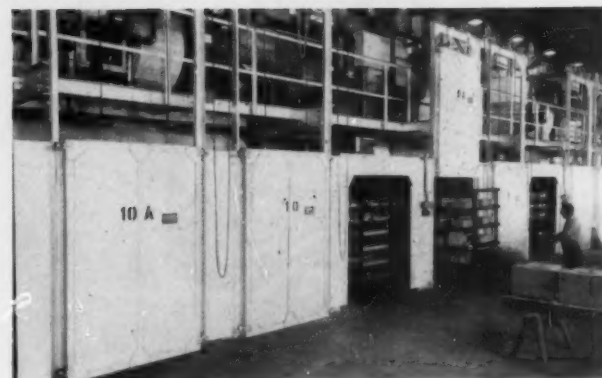
Cincinnati Milling Mach. Co.
Farrell-Birmingham Co., Inc.
United Engineering & Fdry Co.
Continental Fdry. & Mach. Co.
Industrial Brownhoist Co.
Rodney Hunt Machine Co.
Canadian Car & Foundry Co.
Kaukauna Machine Corp.
Westinghouse Electric Corp.
Fairbanks-Morse & Co.
General Electric Co.
Warner & Swasey Co.

Bucyrus-Erie Co.
Worthington Corp.
Mesta Machine Co.
The Falk Corp.
E. W. Bliss Co.
Ingersoll-Rand Co.
Jaeger Machine Co.
Jeffrey Mfg. Co.
Landis Tool Co.
Link Belt Co.
Love Bros. Inc.
Etc.

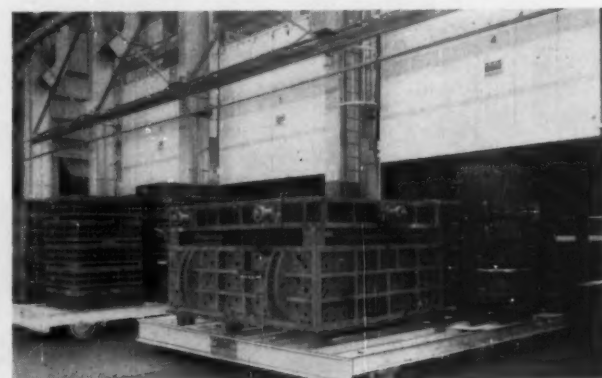
A COMPLETE RANGE OF TYPES AND SIZES . . .

for every core baking and mold drying requirement:

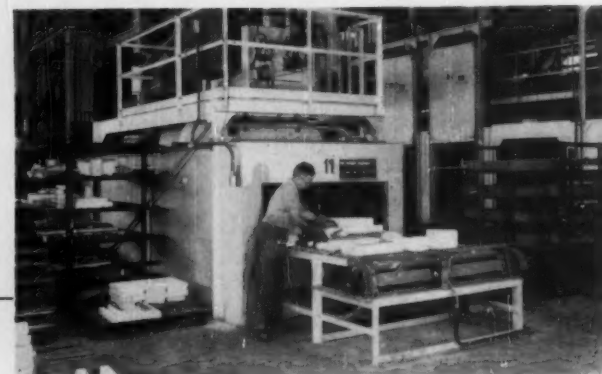
Tower Ovens • Horizontal Conveyor Ovens • Car-Type Core Ovens • Car-Type Mold Ovens • Transrack Ovens
Rolling Drawer Ovens • Portable Core Ovens
Portable Mold Dryers • Dielectric Core Ovens



Small and medium cores are baked in a battery of six Coleman Transrack Core Ovens, each taking two 4' x 6' x 6' portable core racks. Unique compensating forced air cooling chambers located between each pair of ovens.



150 ton capacity Coleman Oven cars move 60 feet from loading, through oven to unloading by means of push button sub-floor car haul systems.



Coleman Continuous High Speed Horizontal Conveyor Redry Oven with 5'0" wide x 25'0" long tunnel dries washed cores in 15 minutes.

CIRCLE NO. 137, PAGE 7-8

Partners In Progress

New **BULLARD** Foundry and



Three of the seven Coleman Car Type Core and Mold Ovens for cars 14'6" x 25'0". Push button operated doors at both ends of ovens and electronic controls are among the fully automatic operating features.

For over 75 years Bullard Machine Tools have been known throughout world industries for their high quality. In planning its new foundry Bullard conducted a thorough search for the latest, most efficient methods of production. The important objectives were better quality grey iron castings, lower unit cost, increased production and better working conditions.

Coleman Oven Engineers, called in at the planning stage, provided Bullard Engineers practical assistance based on more than half a century of experi-

ence. To accomplish efficient production flow through core baking and mold drying, they recommended 7 large Coleman Car Type Core and Mold Ovens, 6 Coleman Transrack Core Ovens, and a Coleman Continuous High Speed Horizontal Conveyor Redry Oven.

As builders of the world's only complete line of foundry ovens, Coleman Oven Engineers can recommend the right ovens for your needs. It pays to have Coleman help you . . . there's no obligation.

WRITE FOR BULLETIN 54



THE FOUNDRY EQUIPMENT CO.

1825 COLUMBUS ROAD

CLEVELAND 13, OHIO

World's Oldest and Largest Foundry Oven Specialists

CIRCLE NO. 137, PAGE 7-8

Mg Association Studies Earth Satellite

■ The 12th Annual Convention of the Magnesium Association went right out of this world during a featured talk on the magnesium-skinned earth satellite. This session, as well as more down-to-earth technical discussions, took place at Chicago's Drake Hotel, October 4 and 5.

President D. T. Wellman, Wellman Bronze & Aluminum Co., presided at the sessions. Other officers of the group are: J. E. Pepall and P. B. Craighead, vice-presidents, and J. V. Cosman, treasurer. Jerry Singleton is executive secretary.

R. E. Short, Kleinschmidt Laboratories, Inc., presented "Magnesium As Used in High Speed Teleprinters," a paper in which he discussed a military teleprinter which employs sand cast magnesium frames. All castings used in the machine are AZ 63A alloy in the heat treated and aged (T6) condition. The principal defects encountered in these castings, Short said, are flux inclusions and the presence of iron in the casting surface.

Magnesium castings in small electric motors were discussed by J. W. Tweedy, Redmonds Motors Co. His report showed the competitive advantages gained by switching from gray iron to magnesium castings. The parts converted to magnesium die castings include stators, stator shells, and end frames.

Weight-saving was the cause of introducing magnesium castings to the manufacture of another electrical apparatus—the Dictaphone. Frederick W. Roberts, The Dictaphone Corp., reported on the use of magnesium in portable tape recorders and dictating machines. Roberts reported one fire caused by a tool striking a sand inclusion in a casting. He stated that this problem will not recur, since all castings are now die cast.

Problems in finishing magnesium castings were discussed in the paper, "Magnesium in Military Electronics," presented by Arthur Maynard, General Electric Co. Maynard also discussed the use of magnesium castings as gears and shafts.

A proposal to change specifications for magnesium castings was presented in "Effect of Section Thickness and Microstructure On AZ91 H.T.A. Magnesium Castings." Author John K. Dietz, Chance Vought Aircraft, Inc., presented evidence to establish the need for a specification that would "reflect the attainable properties in various sections rather than the existing specifications which have requirements that cannot be met in all cases."

MELTING METAL with SUN-POWER

D. C. HALACY, JR. / *Scientific Member
Association for Applied Solar Energy*

Industry studies solar furnace for low-cost, high-temperature melting

Will the sun soon be on foundry payrolls?

The saying that there is nothing new under the sun pertains even in the field of melting metals and other materials. As early as 1745, Louis XIV earned the title of "Sun King" when one of his scientists melted iron and silver with a solar furnace. Politics of the day proved hard on another researcher, when Lavoisier was beheaded in the Revolution because "the Republic has no use for scientists!" However, M. Lavoisier did succeed in melting platinum and must have reached temperatures of about 1750 C (3182 F). He also noted prophetically that "the fire of ordinary furnaces seems less pure than that of the sun."

Fortunately the climate is healthier for science today, and another Frenchman, Dr. Felix Trombe, continues the good work with his co-worker, M. Foex. Still doing the trick with mirrors, they achieve temperatures greater than 3000 C (5400 F) and use them to melt refractory materials and metals commercially.

This is done at the Solar Energy Laboratory at Mont Louis in the Pyrenees, site of an old fort. Using a parabolic reflector 35 ft in diameter, Trombe melts in loads of up to 220 lb at a time. Costs run about 75 per cent of an electric arc furnace, and if the laboratory operated commercially only, it could have written off the cost of the furnace in the last five years.

With a power of 75 kilowatts, the large furnace is used about 30 days a year for commercial melting. The

rest of the work is experimental, and so satisfied is the French National Center of Scientific Research that it is now building a huge, 200 ft mirror which will have an output of 1000 kw.

Interest in solar furnaces has increased greatly in the United States during the last two years, and has resulted in formation of the Association For Applied Solar Energy which lists top industrial names on its board of directors. Stanford Research is conducting research into the feasibility of solar furnace use for industry, and a team of experts is now in France studying the French furnace.

As a background for considering such a device for melting, let us first consider its source of power:

The sun is an orange dwarf star, 93 million miles distant. Energy, believed released by fusion of hydrogen, reaches us with a heat equivalent to a black body radiating at about 6000 K (11,000 F). This results in energy being received on the earth's surface at approximately 0.1 watts/cm². The task of the solar furnace is to concentrate this energy sufficiently to produce high temperature and heat flux.

Although California Institute of Technology has a furnace using an array of 19 lenses, most of the world's solar furnaces are single parabolic reflectors ranging in size from five to 35 ft. A number of optical factors enter the problem, among them the apparent diameter of the sun, which is about 32 minutes of arc. These factors limit ultimate concentration and result in an image size of focus of approximate-



Heats of 200 lb are melted using 35 ft parabolic reflector with costs running 25 per cent less than for electric furnaces.

ly 1/200th the diameter of the reflector. It is within this image that heat flux is available, and melting takes place.

Pol Duwez, professor of mechanical engineering at Caltech, recently presented an ASME paper on the subject. Using realistic figures, he arrives at an ideal maximum attainable temperature of 4900 K (9315 F). This would give a heat flux of 35,000 cal/cm²/min. Further, Professor Duwez feels that 15 feet is about the maximum practical diameter for a one-piece reflector.

Most furnaces in the United States have been converted from searchlight mirrors of optical glass, five feet in diameter. The largest, used by Convair for high-temperature materials research, is ten feet in diameter, of polished aluminum. This has an output of 4.5 kw. Above this size, a number of small mirrors are arranged to form a reflector of the size desired; 3500 flat mirrors, cupped by adjusting screws, are used in the large French furnace.

Experiments have been made with rotating bodies of mercury, generating an alterable parabolic reflecting surface for controlling temperature. In Japan, parabolas have been produced by floating plastic on a rotating vessel of water and allowing it to solidify. However, the bank of small mirrors seems the logical choice for a large, industrial furnace.

As the sun moves across the sky, it is necessary to track it so that its rays may be properly focused. This can be done with the parabolic reflector itself, or an auxiliary flat mirror called a heliostat. Obviously this latter system is more satisfactory since the focal point is fixed. In general, equatorial mounting is used and the mechanism can be of the astronomical, clockwork type, or utilize photo-electric cells coupled to the drive motor. The Convair furnace uses the first method; the French furnace the second.

To control temperature, Convair uses a sliding tubular shield and reports it can hold within plus or

minus 1 degree at 2000 C (3632 F). Dr. Trombe interposes a panel between the heliostat and parabola to effect the same purpose. Small models of the U. S. Air Force's planned 200 ft. furnace use a shutter arrangement to govern light received on the parabolic reflector.

Measurement of high temperatures poses a problem, and it is estimated that optical pyrometers are accurate only to plus or minus 50 C when a temperature of 3000 C (5432 F) is reached. Dr. Trombe feels that the best assurance of having reached a temperature is the actual melting of a substance with that melting point! High-energy flux is usually measured by using water-cooled black-body cavities and checking the rise in water temperature.

Geographical location of the solar furnace installation is of great importance. Stanford Research in a survey recommended a mountain near Phoenix, Arizona as an ideal site. The Association For Applied Solar Energy is located in Phoenix, and plans to build a large furnace there soon. The 200 ft Air Force furnace will be built at Cloudcroft, N. M. at an altitude of 9000 ft.

For an example of the difference in heat energy received in various parts of the country, New York City gets an average of 0.30 kw-hr per sq ft/day; while El Paso receives 0.60/day. In the desert sections of the United States, 300 useful days a year are probable. Dr. Trombe reports 2750 hours of operation in the Pyrenees mountains.

In the United States, Convair uses the solar furnace in work with metals, "cer-mets", ceramics, zirconium dioxide, boron nitride and other materials. General Electric purifies phosphors for use in communications equipment. Others using furnaces are Kennecott Copper, Sandia Corp., U. S. Bureau of Mines, and Dupont. Besides these, a number of schools, including Arizona State with the first heliostat-equipped furnace in this country, use the solar furnace for research and on government contracts.

A furnace in Algeria, 27 ft in diameter, is used to fix nitrogen from the atmosphere, and for other purposes such as the fusing of aluminosilicates. Russia has a large furnace at Tashkent, probably even larger than the French furnace, but Dr. Trombe has apparently done the

most both in research and commercially with his big mirror.

Built in 1946 in an old fort at Mont Louis, the Trombe furnace cost only \$60,000, (not including auxiliary equipment) and has stood up well despite its exposure. The glass mirrors require no maintenance, and even high winds have not disturbed the installation. Although it is of huge size for a 75 kw furnace, there are a number of redeeming features.

With the exception of atomic explosion, or the "shock tube", both of extremely short duration and possessing other obvious drawbacks; and the high-intensity arc image which will be discussed later, the solar furnace gives the highest heat known. This heat is delivered at no cost for power.

As Lavoisier noted two hundred years or so ago, solar heat is pure heat. There is no carbonization, no chemical action. There are no electrodes, no magnetic or electrical fields. Operation in a controlled atmosphere is simple, and cavity heating in centrifugal furnaces from the core outward is practical.

Although Trombe attains higher temperatures with his smaller fur-

naces, and has worked out interesting movable carriage systems for melting powders and so forth, we will consider mainly the large furnace and the rotating cavity furnaces since it is these he uses for melting in loads of 66 lb of refractories, or 220 lb of metal at a time.

These centrifugal furnaces have capacities up to 52.5 qts, and openings to admit radiation about 3.9 in wide. Rotating at from 125 to 750 rpm, the furnaces are water cooled by an external jacket and are very useful in purifying operations since the molten metal can be isolated from the walls.

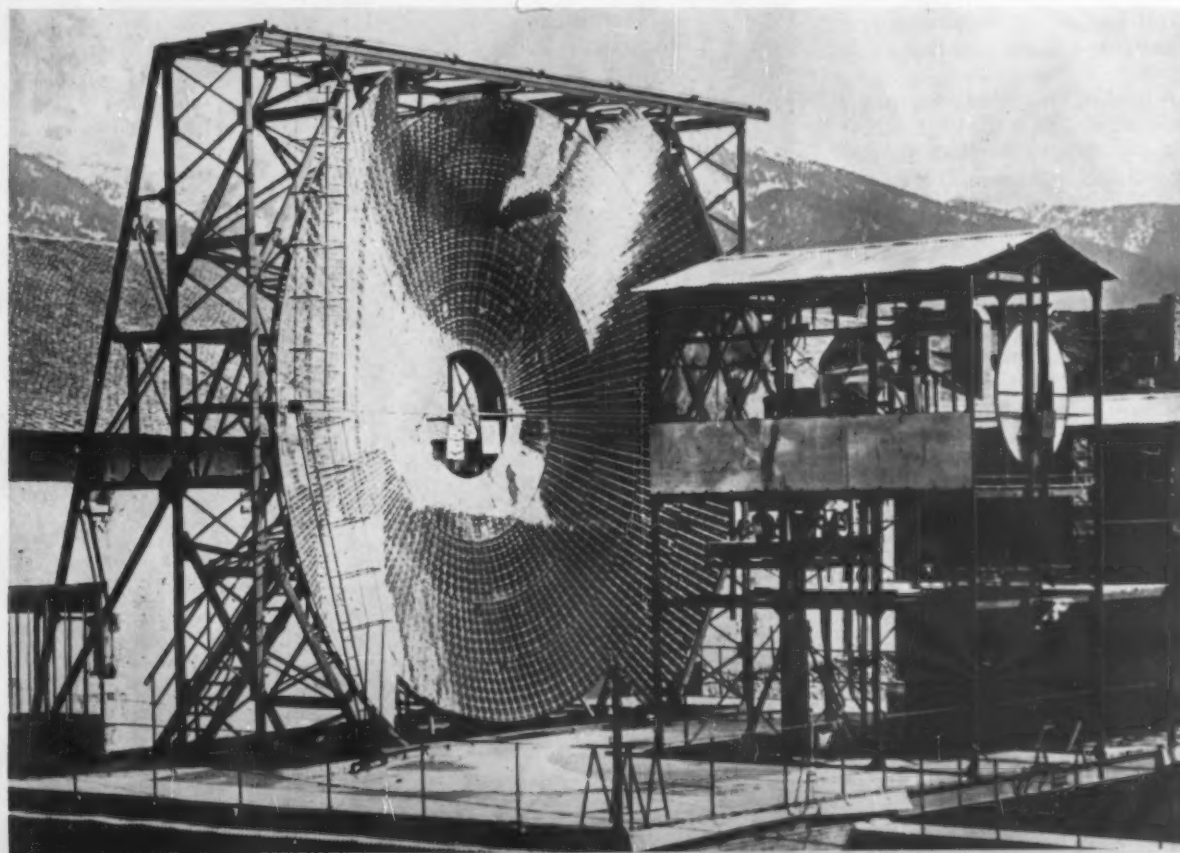
As previously mentioned, work can be performed in a conditioned atmosphere, using pyrex or quartz. In tests, Trombe has reduced chromium oxide in hydrogen or in a vacuum at 2000 C (3600 F).

While the large furnace is not the most efficient of the French Solar Energy Laboratory, it does concentrate more than 80 per cent of the energy in an image about 4.4 in. diameter with a flux density of 1600 watts/cm² and a temperature in the neighborhood of 3300 K. It is interesting to speculate on the performance and capacity of the 200 ft furnace being built, since it will gather 30 times more energy. With power equivalent to a 1300 hp generator, Trombe expects his new furnace to melt for half the cost of electric arc.

An interesting possibility lies in the development of the high-intensity carbon arc-image furnace, although to date these are very inefficient, converting only 1 per cent of the electrical energy into heat at the focus.

Stanford Research speculates on the possibility of using thirty-six 200 kw arcs, each with a 2.5 ft mirror and all directed at an eighteen ft mirror. This would give the same flux as a ninety ft solar mirror and obviate such a huge installation as that planned by both France, and our Air Force. It has been reported that temperatures up to 10,000 K have been attained with high-intensity arc, and the British and Germans both have made arcs of up to 600 kw. However, these are not attainable in this country, and Stanford Research admits much work must be done before the idea would be feasible.

Highest heat known is produced without carbonization or chemical action in French furnace built in 1946.





HOLLY and SAND go Hand in Hand

C. R. WOLF / President
New Jersey Silica Sand Co.

**Hobby started in sand company woodlot
has become world's largest private holly orchard**

Editor's Note:

Many foundrymen have interests, abilities, and accomplishments in other fields than the foundry. One such "fellow man" is C. R. Wolf. MODERN CASTINGS has asked him to write the story of his holly-growing hobby. If you enjoy reading this or know of other foundrymen with interesting hobbies, write a letter to the Editor.

❖ "What a wonderful sight."
❖ "Amazing!" "Who would have thought that holly trees could be so beautiful!" These are just a few of the comments made by hundreds of visitors to our holly orchard in Millville, New Jersey.

These visitors have come from practically every state and many foreign countries. Included are horticulturists, scientists, doctors, foundrymen, and the interested public.

Many questions have been asked. "How did you happen to start such an interesting hobby?" "Where did you get the trees?" "How old are they?" "When was the orchard started?" "Isn't holly a slow grower?" "Where can I get several trees?" We will try, in this story, to answer these questions and more.

The holly idea started with us in 1926 when a few boxes of holly sprigs were cut from company owned woodland and given to friends at Christmas. This practice grew each year until it was decided in 1939 to plant an orchard.

Perhaps, too, the holly hobby at

the New Jersey Silica Sand Company was stimulated by Robert Southey's verse "But when the bare and wintry woods we see, what then is so cheerful as the holly tree," or perhaps the symbol of holly at Christmas which dates back to the time of the Romans and their festival of Saturnalia.

The trees for this orchard were, for the most part, found growing in the wild on company property. As the heavy equipment would strip off the overburden to mine the silica and molding sands beneath, the hollies were saved and transplanted in an adjoining field which is now the orchard. A few trees were also secured from nurseries.

A total of 2800 trees were planted during 1939 and 1940. These trees are now approximately 16 to 18 feet in height and are pruned each Christmas. (This is proof that holly is not a slow grower.) The pruned sprigs are given to friends to decorate their homes for the holiday season.

This hobby has grown until now we have the largest private collection of hollies in the world.

Every holly tree must be carefully planted. It is well to remember, plant a ten dollar tree in a fifty dollar hole, not a fifty dollar tree in a ten dollar hole. In other words, dig a large hole and fill in around the plant with good rich top soil and peat moss. Water thoroughly to firm the soil mixture around the roots of the newly planted tree. Remember to give plenty of space for the tree to grow. Holly trees grow from fifteen to

twenty feet tall and have a spread nearly equal to their height.

Much research is conducted on holly in our orchard. As a result of this research eleven new varieties have been developed and released to the nursery trade.

Holly trees, unlike most plants, resemble people to the extent that they are either male or female. The blossom of the female holly

tree, when pollinated, forms the berry, while the male tree does not bear berries. The male tree's flowers bear the pollen which makes it possible for the female tree to have berries. For this to take place, the male tree must be near enough to the female tree for bees, wind, and other natural carriers of pollen to transfer the pollen. As a general rule, the closer the male tree is

Foundrymen have aided in promoting holly as a hobby. It is being grown not only along the east coast but in the west and midwest.



planted to the female tree the more berries the latter will bear.

Close examination of the female flower reveals a large greenish knob in the center of the flower which is called the pistil. The stems about the pistil are called stamens, which are small and withered on the female flower. On the other hand, the stamens are large and plumb on the male flower and are full of pollen while the pistil is very small. Both are very fragrant.

George Washington's diary tells how he planted holly seeds to raise the holly hedge at Mount Vernon. Holly seeds may be planted, but they require one to two years to germinate, and at least five more years to blossom to determine whether the plant is male or female. The most desirable method to propagate is with vegetative cuttings.

The American holly can well be a versatile plant in the hands of a landscape gardener. It can be used as a shrub, hedge, or a tree in the formal garden as well as into the naturalistic landscape development. The people of Portland, Oregon, have been planting hollies for many years at the request of landscape architects. It is estimated over 70,000 hollies are now planted in this beautiful city. Holly blossoms were supplied for table decorations during the 25th Anniversary of the Millville Kiwanis Club.

American holly is growing as far north as Rochester, New York, and parts of New Hampshire, and south to Florida. It is also growing in many parts of the midwest and west.

Holly trees are pruned to give a more symmetrical shape. Prune your holly during the Christmas season when it is not harmful and use the sprigs for decorating the home.

Many foundrymen visit the holly orchard and become intensely interested in the holly hobby. This is especially true during the annual open house which is always held the first Sunday in December. One took home a small tray of cuttings to try his luck at propagation. His results were outstanding and he has raised for sale over 5000 hollies each year since to supplement his income.

Another foundryman has pur-

chased five acres of land and has it planted in hollies to supply sprigs to the Christmas trade.

One foundryman is collecting different varieties of hollies and has them planted around his home. To date he has over 25 varieties in his plantings.

Today as this paper is being written, a man from central Pennsylvania who has a planting of Christmas trees as a hobby, visited our orchard for information. He wishes to also plant an orchard of holly. As you can see, the holly hobby idea is rapidly spreading. Several orchards in Oregon and Washington had their beginning as hobbies.

To promote more interest in holly, The Holly Society of America was incorporated in 1947. Today the society, with the author as its president, boasts of members in nearly all states with its purpose to promote the use and cultivation of holly. Another goal of the society is to promote research in the field of holly and conservation of native hollies.

So stimulating has this hobby become that friends began collecting various decorative items with a holly motif and send them to the author. As a result, a holly china collection of over 600 pieces has been accumulated. Most of these pieces of china are antiques and are displayed in the company office.

Located in the center of the forty acre holly orchard is a farm house built in the early 1800's. This house has been remodeled as a holly guest house. Everything as far as possible carries the motif of holly. The lamps, china, glassware, candlestick holders, and even the ash trays are decorated with holly. Many a mold has been rammed and poured by foundry friends relaxing in the beautiful surroundings of hollyhouse.

The scope of interest in holly is illustrated by the fact that the Baltimore & Ohio Railroad located a beautiful specimen holly tree along their main line between Baltimore and Philadelphia in Jackson, Maryland. The tree which was purchased by them is approximately 60 feet in height and is 24 inches in diameter at breast height. The age is estimated at 250 years. It has an excellent symmetrical shape and is decorated each Christmas



Enthusiasm for holly extends even to farm guest house in center of orchard where motif is also seen on 600 pieces of china.

with hundreds of balls and lights. Many thousands of people attend the special lighting ceremony held each year in mid-December.

Another prominent tree is located at Indian Steps in York County, Pennsylvania. Legend has it that the early Indians used its berries for bartering with other tribes.

A tree has been located near Ocean City, New Jersey, which is approximately 300 years old. When the new Garden State Parkway was built, the tree was left remaining between the north and south lanes of traffic. Extending four miles south from this tree, over 1100 hollies have already been planted along this new parkway.

A mile of beautiful hollies have been planted by the Richmond Garden Club just north of Richmond, Virginia, on Route No. 301. The oldest holly on record is located just off Route No. 17 north of New Bern, N. C. This granddaddy tree is 72 feet high and over 11 feet in circumference at breast height. Its age is estimated at 450 to 500 years.

Also, during your travels it would be a splendid sight to see Pinehurst, North Carolina, where hollies are planted for shade trees. These trees, planted in 1895, have been pruned free of branches to a height of eight feet. They are now over 25 feet in height and add much to the beauty of the city.

Space does not permit more detailed information regarding the culture and propagation practices. So for more detailed information on this or the Holly Society of America, please contact the author.

Foundrymen, plan for your retirement hobby! Holly is certain to keep you enthused, make your eyes sparkle, blot out ailments and worries. It will give you something which will allow you to say "This is mine; I did it." Come see us the first Sunday in any December! and MERRY CHRISTMAS!!

Acknowledgment

■ The author would like to acknowledge the invaluable assistance of Daniel G. Fenton, horticulturist for the holly orchard, in preparing the technical part of this article.



W. T. UNFRIED / Ass't Metallurgist
Texas Electric Steel Casting Co.

A COMPLETE SLAG ANALYSIS



Present laboratory equipment and usual procedures may be used with these analyses.

in 45 MINUTES

Texas Electric Steel's rapid chemical procedure gives steel melters a new tool for quality control

Which came first, the slag or the steel? As is the case with eggs and chickens, you can't have one without the other and it probably doesn't matter which came first. Steelmakers do know that it is their control of slag that determines the quality of their steel.

Steel melting is a refining process in which an oxidizing condition is created which dissolves the oxides of such elements as carbon, manganese, silicon, and phosphorus into the slag. The analysis of the slag is then used to indicate the quality of the steel.

Texas Electric Steel Casting Co. uses basic electric steel melting, a two-slag process which permits the removal of both phosphorus and sulphur. With electric melting,

melts will be produced in one to one and one-half hours, so the analysis of the slag must be made rapidly if it is to be of any value in control.

The following chemical methods have been used successfully for analyzing basic electric furnace slags. They should work equally well on most other basic slags and will make it possible for one chemist to analyze for the oxides of silicon, calcium, manganese, and iron in about 45 minutes. The oxides of magnesium, phosphorus, and chromium are also obtained very rapidly if desired.

In all cases, the total element present is determined and calculated to the percent of its most prominent form. For instance total

iron is calculated to percent FeO only and not to $\text{FeO} + \text{Fe}_2\text{O}_3$. Calcium is calculated to CaO although it may also be present as some other form of calcium in the slag.

Sample weights have been chosen that can utilize standard laboratory solutions already prepared. The methods have been designed to fit into the daily laboratory practice and cause as little interference as possible.

Precautions

All precautions involving the use of perchloric acid should be followed. Anyone not familiar with its applications should read the discussion on perchloric acid in the 1950 edition of A.S.T.M. *Methods*

of Chemical Analysis of Metals. The two main precautions to be observed in these analyses are: always use nitric acid with the perchloric, and have a hood completely lined with an inorganic substance with as simple an exhaust system as possible. A hood and flue that can be washed down daily with water is ideal. If a wash down hood is not used the flue and baffles should be brushed out regularly.

Sample Preparation

Crush the slag using a porcelain mortar and pestle. Pass a magnet through the slag frequently to remove any occluded iron. Continue crushing until the slag will pass through a 100 mesh sieve. In rou-

TO ANALYZE . . . USE THESE SOLUTIONS

SILICA	Hydrochloric Acid Wash 75 ml HCl to 1000 ml water.			
CALCIUM OXIDE	Ammonium Oxalate 4% in water.	Dilute Sulphuric Acid 1-6.	Potassium Permanganate (Standard) 7.8 gm to 3500 ml. water. Mix one week in advance and filter through asbestos before use. Standardize with sodium oxalate.	
MANGANESE OXIDE	Acid Mixture 250 ml water, 50 ml sulphuric acid, 75 ml phosphoric acid, 100 ml nitric acid, 25 ml 5% silver nitrate solution.	Ammonium Persulphate 150 gm ammonium persulphate to 1000 ml water. Keep in stoppered bottle and mix fresh every 2 or 3 days.	Sodium Arsenite (Standard) Dissolve 35.5 gm anhydrous sodium carbonate in 400 ml boiling water. Add 11.70 gm arsenious acid As_2O_3 . Cool and dilute to 10,000 ml.	
IRON OXIDE	Sulphuric - Phosphoric Acid Mixture 750 ml water, 500 ml sulphuric acid (allow to cool somewhat), and 500 ml. phosphoric acid.	Potassium Dichromate (Standard) 2.05 gm to 1000 ml water. Standardize with pure iron wire.	Stannous Chloride 12.5 gm stannous chloride in 15 ml HCl. Heat until dissolved and solution clears. Pour into 75 ml cold water. Keep several pieces of mossy tin in the bottle.	Indicator 1.0 gm diisphenylamine dissolved in 100 ml concentrated H_2SO_4 .
PHOSPHOROUS	Sodium Sulphite 57 gm of the anhydrous salt dissolved in 1000 ml cool water. Do not use for more than one week.	Ammonium Molybdate 300 ml sulphuric acid to 700 ml water. Cool to 122F (50C) and add 20 gm ammonium molybdate. Mix well.	Hydrazine Sulphate ¼ gm hydrazine sulphate to 500 ml water. Do not keep over 30 days.	Dilute Perchloric Acid 40 ml acid diluted to 1000 ml.
CHROMIUM	Potassium Permanganate (Standard) 7.8 gm to 3500 ml water. Mix one week in advance and filter through asbestos before using.	Ferrous Ammonium Sulphate (Standard) Add 450 ml sulphuric acid to 900 ml water. When cool add 225 grams ferrous ammonium sulphate. Dilute to 9000 ml.	Sulphuric - Phosphoric Acid Mixture 750 ml water, 500 ml sulphuric acid (allow to cool somewhat), and 500 ml phosphoric acid.	

tine work drying the sample at 110 C may be omitted if periodic checks show the moisture to be less than one percent.

Basic Treatment

Weigh a 500 mg sample into a 250 ml Erlenmeyer flask that already contains 25 ml of a 4 per cent boric acid solution. Swirl the flask immediately to prevent the slag from caking on the bottom. If no fluoride-containing compounds such as spar have been added to the slag during the melting operation, then the boric acid may be omitted but should be replaced by at least 15 ml of water. The boric acid will prevent any fluoride in the slag from volatilizing the silica present.

Add 20 ml of perchloric acid followed by a few drops of 1-2 nitric acid. Boil on the hot plate until dense white fumes of perchloric acid clear from the bottom of the flask and are seen only in the

neck. Swirl the flask frequently during the boiling to keep any silica down in the acid. Fume for a few minutes, then remove from the hot plate, cool in air, then in water until cool enough to handle easily. Add about 20 ml water and mix well.

Note: solutions for use in the following analyses are in the table above.

Silica

Procedure: Filter the solution through an 11 cm Whatman 41-H filter paper or equivalent into a 100 ml volumetric flask. Use suction and support the paper on a platinum cone. Rinse the inside of the Erlenmeyer several times with hot water and pour through the funnel. Do not be concerned at this point with any silica adhering to the inside of the flask.

Remove the volumetric flask and place in a cooling bath. Place an-

other flask under the funnel. Rinse the silica from the Erlenmeyer flask using a rubber policeman to scrape it loose if necessary. Wash the silica and filter paper several times with hot HCl wash solution, and then several times with hot water. Ignite the silica and paper in a clay annealing cup at 1300-1500 F. When cool empty onto balance pan and weigh.

$$\% \text{ SiO}_2 = \frac{\text{Wt. SiO}_2}{\text{Wt. Sample}} \times 100$$

When the master solution from the silica separation has cooled, dilute to the mark, mix well and reserve for the remainder of the analyses.

Calcium Oxide

Procedure: Transfer 20 ml of the master solution reserved from the silica determination to a 500 ml wide mouth extraction flask (Soxhlet flask). Add 150 ml water, neutralize with ammonium hydroxide

Electric furnace melting means slag analyses must be done fast to be useful.



A Complete Chemical Analysis in 45 Minutes

■ A streamlined procedure giving time-saving chemical analyses for the ferrous foundry was published by Mr. Unfried in *Modern Castings*, April, as "A Complete Chemical Analysis in 45 Minutes." The easy-to-use chart of solutions for those analyses has been reprinted. Single copies of the chart are free, additional copies, 10 cents.

and add about 2 ml in excess and bring to a boil. Add 20 ml hot ammonium oxalate solution and boil for 1 min. Then add about one gm dry oxalic acid and boil for 3 min. If any brown iron precipitate does not dissolve, add a little more oxalic acid. If a large excess of oxalic acid is necessary it is an indication that too much ammonium hydroxide was added in the beginning.

Remove from the hot plate, cool in water bath, and filter with suction. Use a No. 3 porcelain Gooch crucible with a double glass fiber filter mat. Rinse the inside of the flask well being sure all the precipitate is transferred to the crucible. Wash well with cold water to remove all soluble oxalates, but avoid a large excess of water as the calcium oxalate is slightly soluble.

Carefully remove the mat and precipitate and place back in the thoroughly rinsed Soxhlet flask. Rinse the inside of the crucible with a stream of 1-6 sulfuric acid catching the washings in the Soxhlet flask. Add 150 ml water and 5 ml con sulfuric acid. Heat to 70-80 C. Be sure all the precipitate has dissolved, then titrate while hot with standard potassium permanganate.

Calculation: Standardize the potassium permanganate by weighing several 0.100 gram samples of sodium oxalate into 500 ml Soxhlet flasks. Dilute to about 150 ml with water; add ml con H_2SO_4 , heat to 70-80 C and titrate with potassium permanganate.

$0.1000g. Na_2 C_2 O_4 = 0.0472g. KMnO_4$
 $0.1000g. Na_2 C_2 O_4 = 0.0420g. CaO$

$0.0472g. KMnO_4 = 0.0420g. CaO$

With these solutions, 1 ml of the permanganate is equivalent to approximately 1.94 per cent CaO on a 0.100 gram sample.

Manganese Oxide

Procedure: Transfer 20 ml of the master solution to a 250 ml Erlenmeyer flask. Heat to boiling and add 20 ml of the acid mixture. Let boil for about a minute then add 60 ml water followed by 20 ml ammonium persulfate. Wait for solution to turn red and just begin to boil but *do not boil*. Remove from hot plate and allow to cool slowly for about 5-10 minutes, then cool below 30 C in running water.

Titrate rapidly with sodium arsenite solution to an orange color, then continue drop-wise to a clear yellow end point that does not change with further addition of the arsenite.

Calculation: Carry a standard sample with approximately the same manganese content as the unknown sample through this same procedure.

$$\frac{\text{Titration of std.}}{\% \text{ Mn in std.}} = \frac{\text{titration of sample}}{\% \text{ Mn in sample}}$$

Iron Oxide

Procedure: Transfer the remaining 60 ml of master solution to a 300 ml Erlenmeyer flask. Add 10 ml HCl and heat to about 80 C. Add stannous chloride drop-wise until the solution changes from clear yellow to a clear white. Then add one drop in excess. Remove from hot plate, dilute to 150 ml and cool in running water. Add 10 ml of saturated Hg Cl_2 solution and mix gently. Wait one minute. Follow with 10 ml sulfuric-phosphoric acid mixture and 3 drops of indicator solution. Titrate with potassium dichromate until one drop causes a bright purple color that will persist for several minutes.

Calculation: One ml of the potassium dichromate will be approximately equal to 1.0 per cent FeO on a 0.3 gm sample. The solution should be standardized with iron wire by dissolving a 0.1 gm sample with 10 ml HCl and then treating exactly as the 60 ml of master solution. This will give the Fe equivalent of 1.0 ml of the dichromate. Multiply the Fe equivalent by 1.28 to obtain the FeO equivalent of one ml.

$\% FeO = ml K_2 Cr_2 O_7 \times$

FeO equivalent X 100

Wt. Sample

Note: The standard $KMnO_4$ solution used for chromium or CaO may also be used to titrate iron, and no indicator will be required. This solution will have to be standardized for FeO as in the $K_2 Cr_2 O_7$.

Phosphorous, Chromium, and Magnesium

The oxides of phosphorous, chromium and magnesium can also be determined if desired by slightly modifying the basic treatment. It will be necessary to weigh a 1.0 gm sample of the slag, and at the same time to double the amount of boric acid and to increase the perchloric acid to 35 ml. The filtrate should be collected in a 200 ml volumetric flask.

Phosphorous Pentoxide

The P_2O_5 is determined by transferring 10 ml of the master solution to a 100 ml pyrex volumetric flask. Continue exactly as in the determination of phosphorous in "A Complete Chemical Analysis in 45 Minutes," *MODERN CASTINGS*, page 87, April, 1956. This sample for slag is only half as much as for the steel analysis, so after calculating in the usual manner, the answer should be doubled for the percent phosphorous in the slag. To convert to P_2O_5 , multiply by 2.29.

Chromium Sesquioxide

Transfer 40 ml of the master solution to a 500 ml Soxhlet flask. Continue exactly as in the chromium determination in "A Complete Chemical Analysis in 45 Minutes," *MODERN CASTINGS*, first column, page 88, April, 1956. This sample for chromium in slag is equivalent to 0.4 gm.

To convert per cent chromium to per cent Cr_2O_3 , multiply by 1.46.

Magnesium Oxide

Transfer 40 ml of the master solution to a 250 ml Erlenmeyer flask. Add 5 ml HCl. Dilute to about 150 ml. Add 10 ml of 10 per cent diammonium hydrogen phosphate followed by 10 drops of methyl orange indicator. Cool in ice bath, then add ammonium hydroxide drop-wise until the indicator changes color. Add 5 ml in excess. Allow

to stand overnight, then cool in ice bath and filter. Wash the precipitate about six times with 10 ml portions of 5 per cent ammonium hydroxide. Transfer the paper and precipitate to a previously ignited and weighed porcelain crucible. Char the paper off at low temperature, then heat to about 1400 F in a muffle furnace for 1 hour. Cool and weigh the precipitate ($Mg_2 P_2 O_7$).

$\% MgO = \frac{\text{Wt. Precipitate}}{\text{Wt. Sample}} (36)$

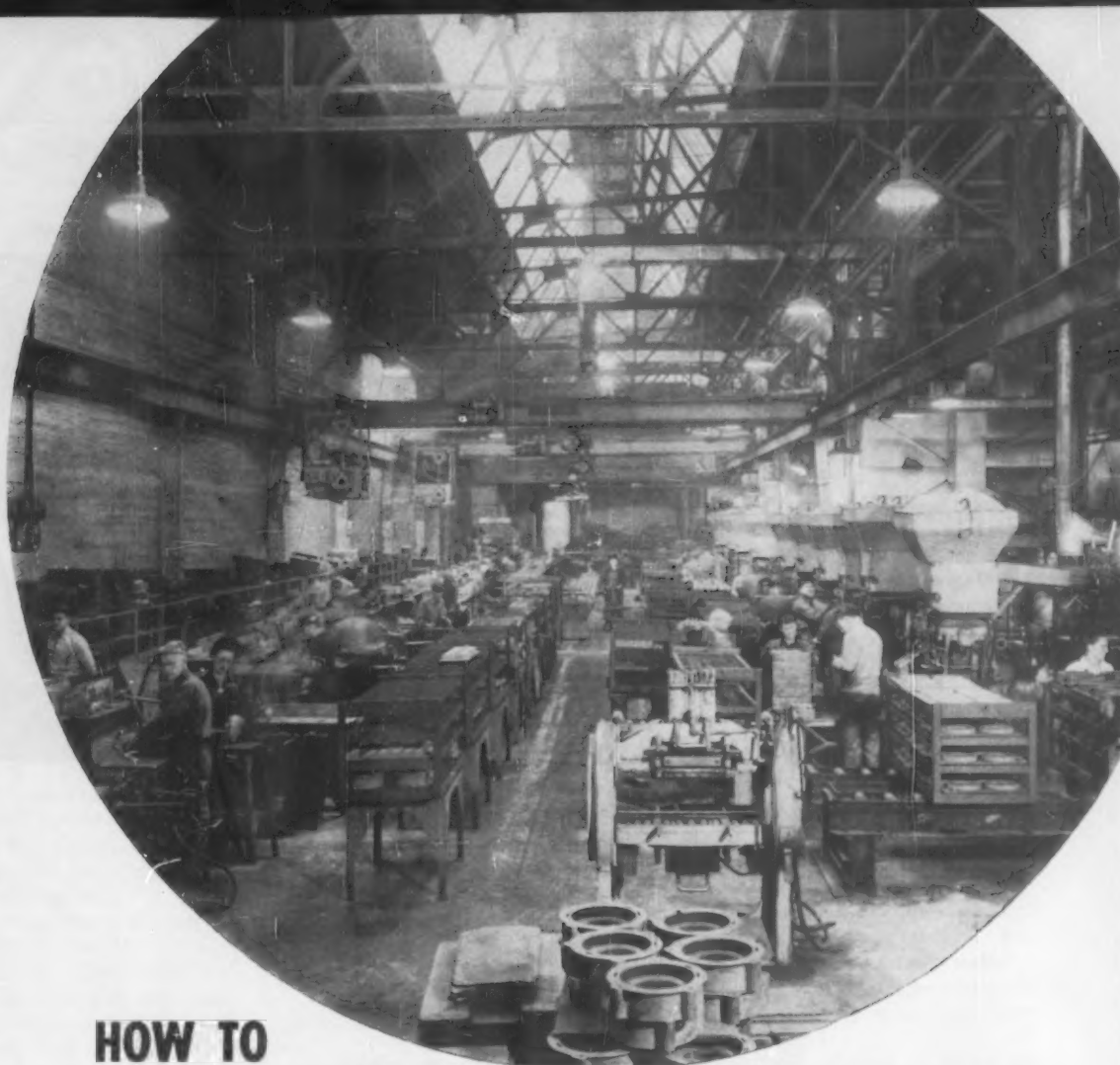
Wt. Sample

An alternate method that may be used is to precipitate the magnesium using 8-hydroxy-quinoline with subsequent titration by standard bromate solution and thiosulphate. This method is described fully in "Develop Chemical Methods for Faster Sand Analysis" by R. A. Willey and J. B. Caine in *AMERICAN FOUNDRYMAN*, (*MODERN CASTINGS*) July, 1948, pp. 50-56. Reserve the filtrate from the calcium oxalate precipitation, and begin with "Neutralize solution with ammonium hydroxide" in the last paragraph on page 55 of the above article.

Bibliography

- George L. Clark, Leonard K. Nash, Robert B. Fischer, *Quantitative Chemical Analysis* W. B. Saunders Co., Philadelphia and London, p. 231.
 R. A. Willey and J. B. Caine, "Develop Chemical Methods for Faster Sand Analysis," *AMERICAN FOUNDRYMAN*, (*MODERN CASTINGS*), July 14, 1948, p. 50-56.
 C. W. Briggs, "Slag Control," *Steel Foundry Facts*, April, 1942, p. 18-19.
 E. H. Scott, *Standard Methods of Chemical Analysis*, Vol. 1 and 2, D. Van Nostrand, 1939.
 W. T. Unfried, "A Complete Chemical Analysis in 45 Minutes," *MODERN CASTINGS*, April 29, 1956, p. 86-91.





HOW TO IMPROVE FOUNDRY LAYOUT

Most plants expand haphazardly, but here's a sound plan to make them genuinely efficient

■ Few foundries have been fortunate enough to start with a well-planned layout. Most have grown and expanded through the years with no comprehensive overall layout plan. The inevitable results have been high labor requirements, poor handling practices and excessive costs of operations in general.

Nevertheless, good layout is possible and it can offer tremendous savings in time and money. Foundries recognize that layout affects the cost of everything used or handled in making a casting. It affects the efficiency of workers and the productivity of machines. This special analysis describes and illustrates the stages of layout analysis and the steps toward improving layout. It will answer many questions that all foundrymen have always wanted to ask.

A MODERN CASTINGS BONUS

This is the 18th in a monthly series presented by MODERN CASTINGS to analyze important problems confronting the castings industry. A limited number of these reprints is available for 50¢ each.

FOUR BENEFITS OF GOOD LAYOUT

ROGER B. SINCLAIR /
Head, Management Engineering Division
Meehanite Metals Corporation



■ This 12-page special report represents the synthesis of 10 years of foundry management engineering experience by the author. He is an industrial engineer and a graduate mechanical engineer who joined the Meehanite Metals Corporation in 1952. He has been head of the management engineering division since 1954.

Foundries must look to good layout for four major reasons:

1. To reduce labor requirements to a minimum and speed productivity.
2. To keep material handling costs to a minimum and promote good housekeeping, order and cleanliness.
3. To keep operations flexible.
4. To keep operations economical with expansion and growth.

Labor costs. The greatest asset of good foundry layout is the reduction of labor costs. Good layout, through economy of motion and handling, keeps labor requirements to a minimum. It eliminates the many delays and wastes of time and effort which can always be found in foundry operations. It permits every man to work more productively for more of his time. It lowers final product cost.

Materials handling. Another asset of well planned foundry layout is the reduction of material and product handling. In the foundry industry, where from 100 to 300 tons of materials and equipment may be handled in the manufacture of one ton of castings, the economies in handling are almost unlimited. Good layout ensures minimum travel between operations, both in distance and frequency of handling. It ensures the flow of materials and product in the right direction, thus eliminating most of the multiple handling and back tracking.

Flexibility in operation is yet another important factor in good foundry layout. We all know that layout is never a static affair. A good layout today may be outmoded tomorrow if tomorrow the type of castings or methods of production change. The planning of good layout will ensure that flexibility is maintained and with it an assurance of reasonable profits irrespective of product or methods change.

Economy. Finally, economy in operations must be maintained when expanding production and plant capacity. Only a careful study of the layout in all sections of the foundry will ensure a balanced expansion and a good return on the invested capital. Too often local changes are planned which upset the layout picture of the foundry as a whole. Increasing production needs can only be met through planned layout changes in all phases of foundry operations.

• All layout, whether the overall arrangement of a foundry, the study of one department, the study of a single work station or of an individual operation hinges on two factors:

1. The flow of material and product through the section under study.
2. The order of all items within the sections under study.

Flow. The study of flow produces the best arrangement of men, machines, material and equipment, to carry out operations in their correct sequence without delay or interruptions.

Order maintains good flow when production is in process.

Both items are essential. You cannot maintain good flow unless order exists and it is difficult to maintain order unless the flow of materials and equipment is right.

With that concept in mind, the most efficient layout would be a production line set-up, with materials entering at one end, moving through each operation until the finished casting emerges from the shipping room. (See Fig 1.)

This is true "line-production" which is rarely possible in foundry layout, even for foundries with large quantities of similar castings to make. At its best, good layout is a compromise between what is theoretically correct and what is practical and economical.

Foundry layout is mainly layout by process. This means that part operations are completed in departments and the work transferred in various stages of completion from one process to the next.

In the making of a casting, a definite sequence of operations is followed. This sequence should be incorporated into the physical arrangement of buildings.

Beginning with:

- Flask preparation,
- Setting of the pattern,
- Ramming of the mold,
- Finishing, drying and closing of the mold,
- Pouring off,
- Shakeout,
- Cleaning, chipping, grinding
- and finally—Shipment of the castings, these operations

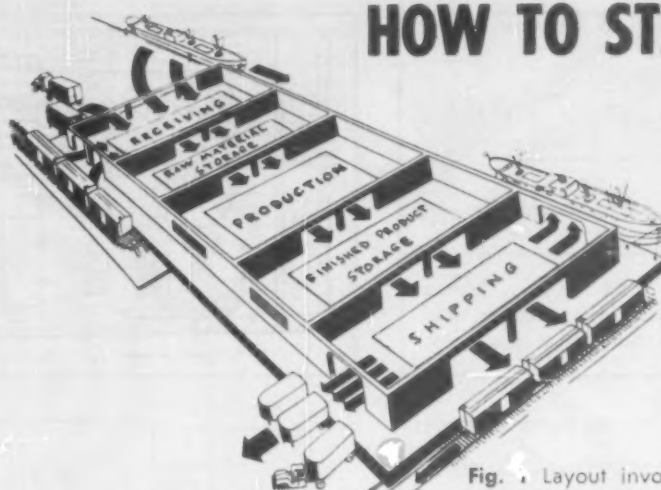


Fig. 1 Layout involves the flow of material, products and the order of all items.

should remain in line whenever possible. All other operations are service.

Service operations—such as the making and finishing of cores, the melting and tapping, the supply of sand, etc.—should enter the line of manufacture at the right point and at the right time.

There are of course, variations in production sequence between the various types of foundries. A mechanized production plant will differ in its basic layout from a non-mechanized jobbing foundry and very often the physical arrangement of existing buildings will change the flow picture from foundry to foundry.

Whatever the physical building

arrangements or the type of foundry may be, the sequence of production should be considered in the arrangement of the overall layout. (See Fig 2)

With this basic principle in mind, you are ready to start a plan for better foundry layout.

For the first step in the overall layout study you need a plan of your foundry site which must show building outlines, railroad spurs, all permanent and temporary installations such as steelwork, foundations, walls, partitions, underground tanks, pits, etc.

Over this general layout, superimpose your flow lines. Differentiate between product flow, material flow and production equipment.

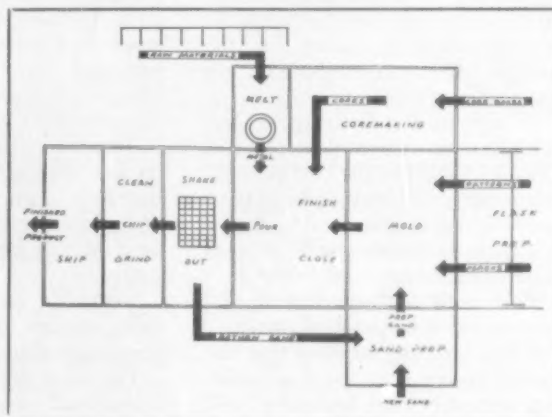


Fig. 2 Production sequence is vital factor in any plan for foundry layout.

HOW TO IMPROVE FOUNDRY LAYOUT

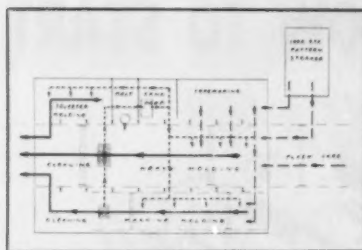


Fig. 3 First step in layout involves a flow diagram with no attention paid to details.

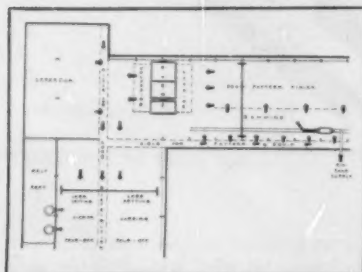


Fig. 4 Second step is the imposing of flow lines on existing plant facilities.

Indicate, wherever possible, the complete cycle of flow, from the moment a material enters production to the time it returns to storage, disposal or shipment.

Fig 3 is a typical illustration of such a flow diagram, which covers the overall foundry operations only, without attention to detail.

Now examine the purpose of each operation. Study the routing of materials into and out of each department. Can you reduce handling distance by relocation of departments? Are the physical arrangements of buildings or departments best suited for the purpose? Can you combine certain sections or similar operations?

To sum up the first stage of layout planning, review your plant as a whole. Establish the best possible relationship of production departments to each other and set up a flow pattern within the limitations of your buildings and budget.

Start with a theoretical ideal—tone it down to practical limits.

When you are satisfied that the overall layout is as good as buildings and structural limitations will

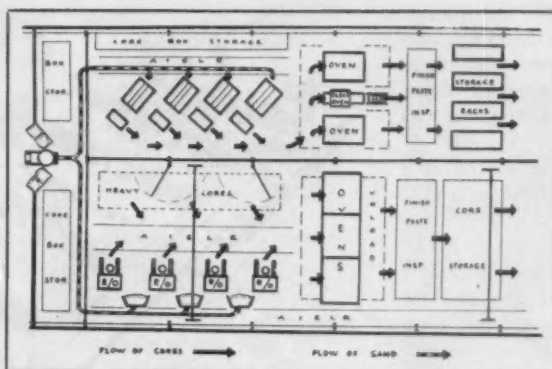
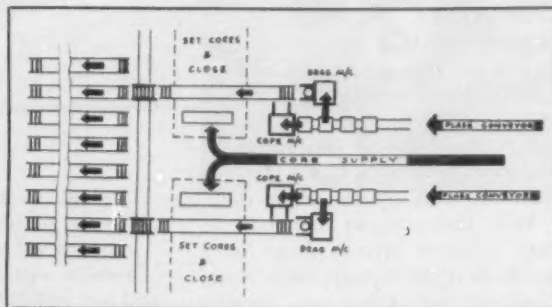


Fig. 5 Rigidity must be avoided, leaving room for changes.

Fig. 6 Plan the processes around the product, its size and volume.



permit, turn your attention to study individual departments.

Section study. This is the second phase of layout study and improvement. It deals with the perfection of the individual departments which make up a foundry.

It starts, as before, with a study of your present departmental layout. Prepare a layout of each department and show the present location of machines, ovens, conveyors, racks, cranes, etc. Be sure to include everything on this plan that can normally be found on your floor. If there is a waste of floor space in a certain area of one department show it on your plan. Don't deceive yourself at this stage, illustrate your layout as it really is.

Then superimpose your flow lines. Differentiate again between materials, equipment and product and show the routing of all items used in the operation of the department.

Develop your questioning attitude towards all phases of your present operations.

The same principles of flow and operational sequence will deter-

mine the best arrangement of machines, the location of ovens and other fixed equipment, the flow for materials and positioning of men.

The study of the functions of the department determines the equipment to be used, the capacities of cranes, the types and size of material handling equipment and the choice and position of other production tools.

It is very important at this stage to avoid rigidity. All departments should remain flexible, prepared to meet changes in product and quantities. All physical arrangements should be laid out with a view to expansion or further mechanization.

This can best be described by several illustrations which show how the principles of good and direct flow are maintained in the study of individual departments.

Fig 4 illustrates a heavy floor molding area.

It indicates correct flow from ramming to pattern draw and finishing; the handling of molds through loading, drying and unloading stages at the mold oven; the final setting out of dried molds

in the pour off area, ready for close-up. Note the correct positioning of the coreroom and the adequate service facilities and aisles, both in the handling of cores and in the distribution of patterns and equipment. A particularly good feature is the close proximity of the cupolas to the pour off area, reducing metal handling to a minimum.

Another layout study, showing the flow through a coreroom is illustrated in Fig 5.

It shows a good arrangement for core sand storage and muller. It indicates lines of sand distribution to various coremaking sections. Note that the sequence of production, from coremaking to drying, finishing, pasting, inspection and storage has been maintained for bench, heavy and machine cores, which are all made in this coreroom. Close proximity between all operations reduces handling to a minimum.

Yet another layout, the study of a machine molding section, is illustrated in Fig 6.

The routing of flasks directly to the two sets of machines and the handling of cores to the close-up stations is noteworthy. Handling of the final mold via transfer cars to pour-off conveyors illustrates good and inexpensive handling with a minimum of labor.

The cover illustrates how Caterpillar Tractor Company laid out its core room to facilitate the flow of cores from blowers and benches to drying oven.

Summing up the second stage of layout improvement:

- Review each department separately.
- Plan the departmental processes around the product—considering its size and anticipated volume.
- Establish the best suitable production equipment.
- When process and machinery are established, consider services, handling facilities and other production requirements.
- Maintain wherever possible operational sequence and direct flow.

Again begin with the theoretical ideal, then trim it to the limits of

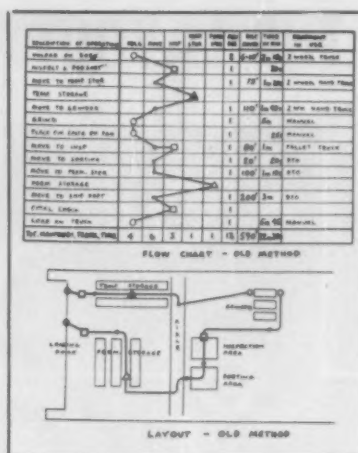


Fig. 7 Former layout shows more steps in operation and use of hand, pallet trucks.

practicability and your budget.

When the departmental study is completed, turn to the final stage of layout planning. This is the study and improvement of individual operations or work stations within each department.

This stage is more limited in its scope. It aims for improvement of individual tasks by provision of easy access to each station, by planning for economy of movements in the performance of operations, by providing the best possible handling aids.

The execution of this final stage can differ widely. A great deal can be done by observation alone. Watch an operation through several cycles. Note the delays, inefficiencies or bottlenecks. Appraise critically the available handling aids and other tools. Study carefully the positions of individual operators and the ease of their movements.

Where industrial engineering aid is available, flow process charts, machine-operator charts and other detailed studies can provide indications of better methods.

Such a study—in this case the investigation of a grinding operation in a cleaning room—can yield substantial savings, as illustrated in Figs 7 and 8. Fig 7 shows the layout and flow process chart of the old arrangement. Fig 8 illustrates the improved layout and method

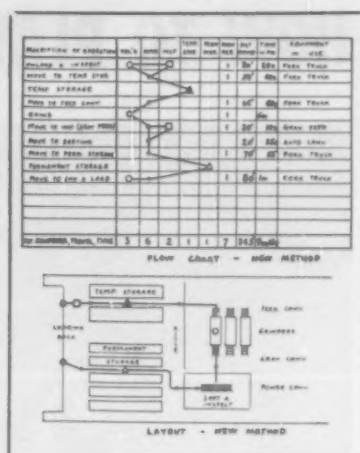


Fig. 8 Straight line flow and employing lift trucks, conveyors cuts time cycle.

of production.

The improvement shows the following savings:

- Manpower reduced from 13 to 7 men.
- Total distance travelled reduced from 590 ft to 345 ft.
- Number of operations reduced from 15 to 13.
- Total time cycle reduced from approx. 22 min. to approx. 9 min.

Each station, each machine or even each individual operation can be studied and analyzed in this manner. The object is improved work station layout to obtain maximum productivity.

To sum up the final stage—give attention to detail. Study each part of a department with the object of isolating the little inefficiencies and delays which, when added together, consume such a large part of an operating cycle. Whether by observation or detailed study, individual efficiency depends on the effectiveness of this stage of layout improvement.

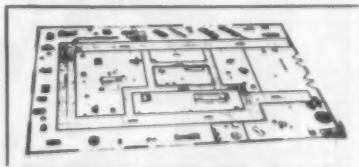
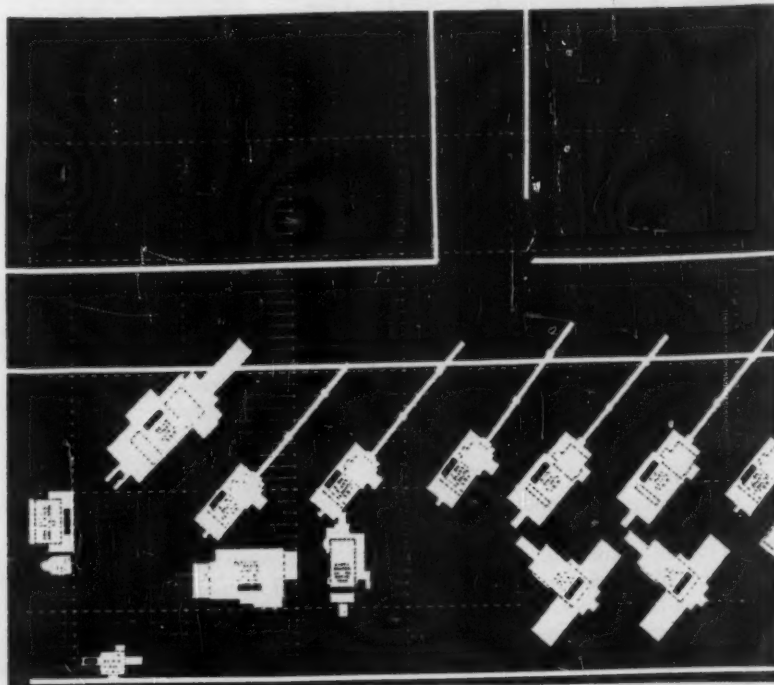


Fig. 9 Template planning puts realism in the layout.

HOW TO PLAN THE LAYOUT



WRONG

Fig. 10 Omission of equipment defeats purpose of templates.

The complexities which have entered our industry in recent years in the form of more complicated machinery and equipment, the use of more and bigger handling equipment and the trend towards more mechanization and even automation have made planning for greater production a complex affair.

Planning today has become a combined operation. It takes technical as well as non-technical men to combine their thoughts and reach agreement on better layout; to get not only a technically perfect but also a financially sound operation.

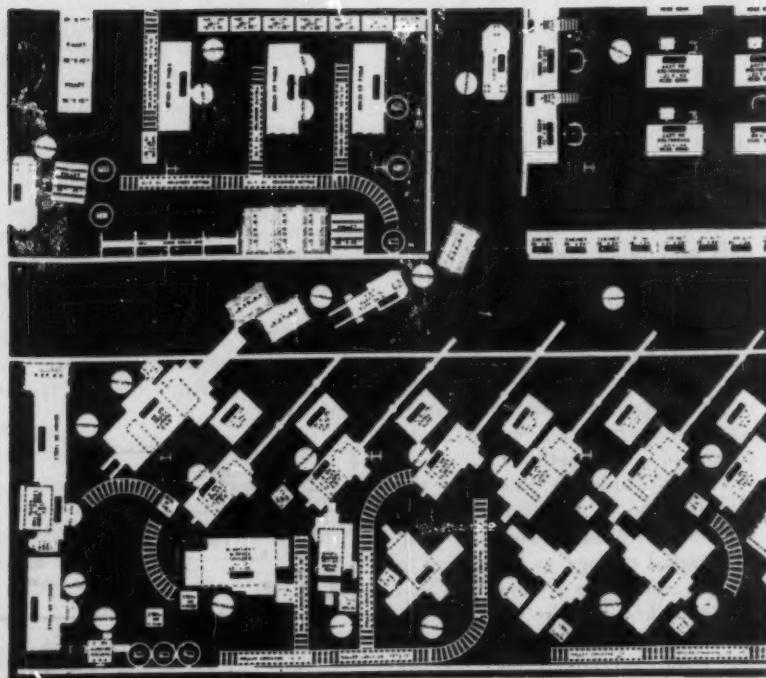
This is where template planning and 3-dimensional models can be invaluable.

Templates are widely used and self-explanatory in application. You place cut-outs of equipment and machines on a floor plan of the department under investigation. This is shown in Fig 9.

Be sure to avoid one pitfall when using templates! You must include in your plan everything that is actually in use on the floor, not just major equipment and machines and partitions as shown in Fig 10 but also conveyors, work benches, boxes, buckets, racks, and the usual assortment of tools required in normal process, as shown in Fig 11.

Remember in template planning to include in your layout everything that is used by the men in the shop in performing their duties.

But even template planning is often inadequate because the space above the floor has become a ma-



RIGHT

Fig. 11 Attention to detail results in accurate layouts.

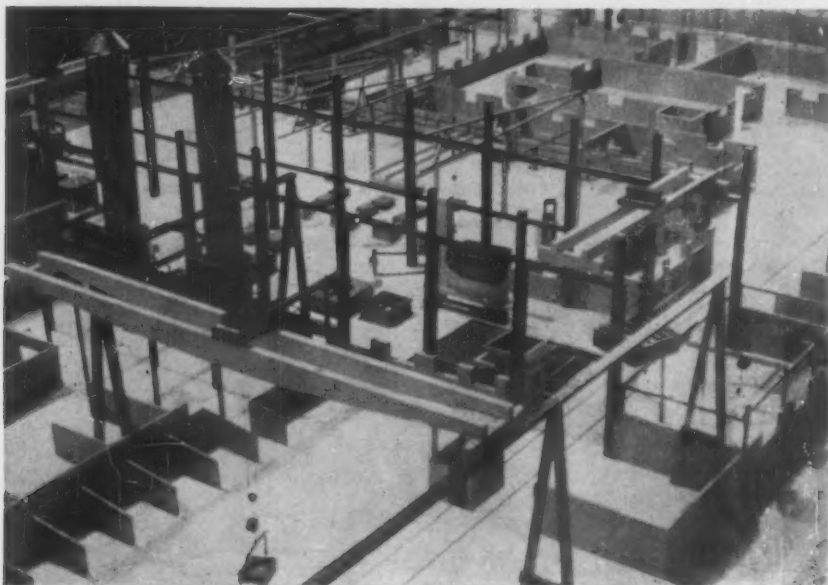


Fig. 12 Three-dimensional models will easily pay for their higher costs through a more accurate plant view.

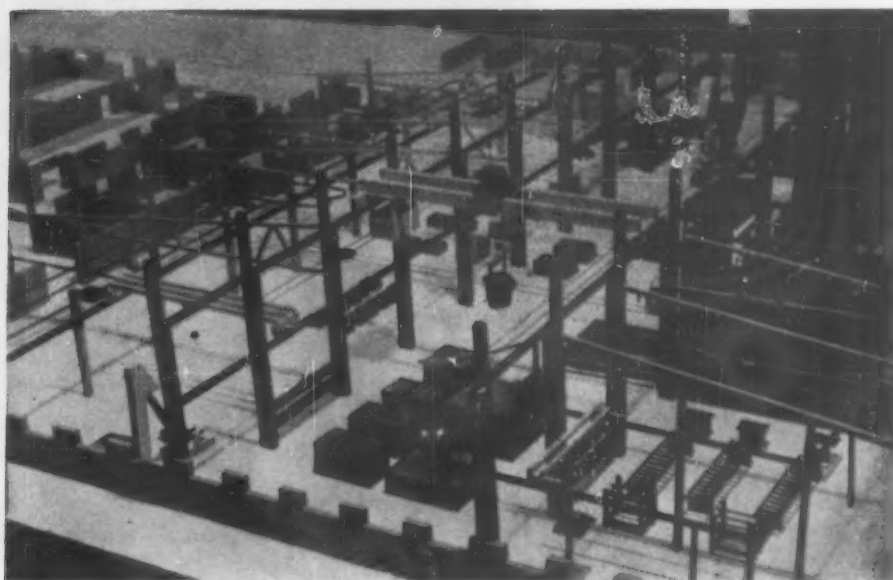


Fig. 13 Bottlenecks are spotted quickly when each detail is shown as it exists.

for consideration, particularly in material handling and storage.

Planning today must consider cubage or 3-dimensional space. The advantages of layout planning with models instead of templates are so outstanding that they easily compensate for the higher cost.

Three-dimensional planning is more flexible. It is a simple task to create alternate plans. Advan-

tages or bottlenecks are quickly recognizable. It makes the project easily understood, particularly by the non-technical members of the planning team. It reduces planning errors such as structural interference or inadequate clearance. Such errors are frequent and very costly to correct.

Three-dimensional models can also be used in foreman and per-

sonnel training. It is easy to demonstrate new functions and changes in methods. Better understanding of all departments and operations gives the men in the shop a better chance to cooperate in making the new plan work right.

For anyone starting a layout improvement program today, the 3-dimensional model is the best possible beginning.

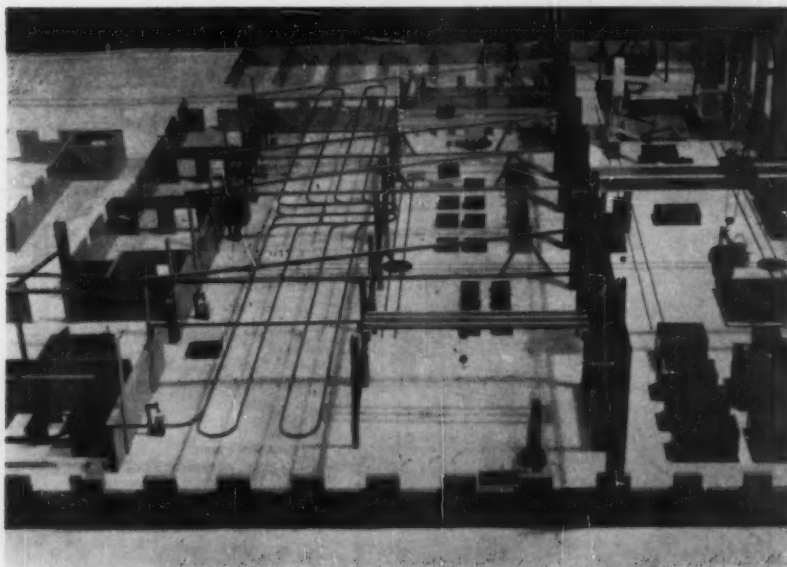
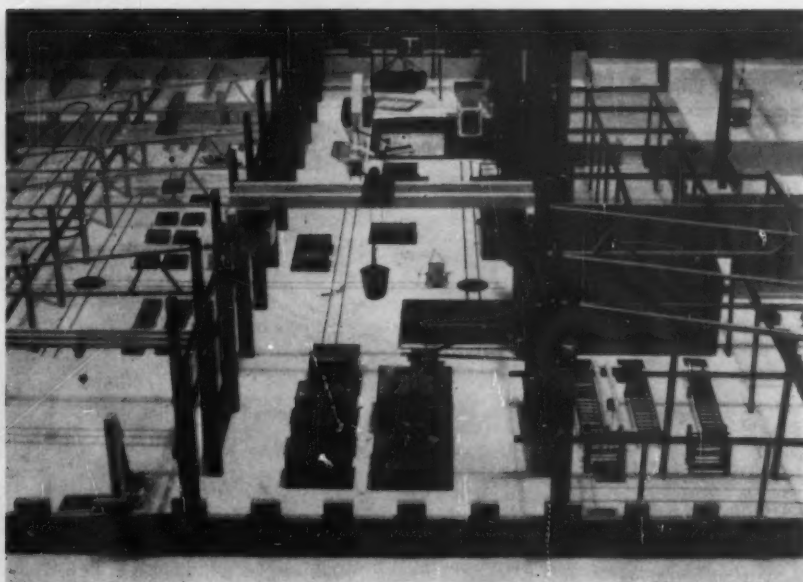


Fig. 14 Utilities, handling equipment must be considered when undertaking any changes in the layout of the plant.

Fig. 15 Good layouts allow non-technical staff members to understand the problems involved in each department.



Figs 12 to 15 illustrate several views of a 3-dimensional model of an old jobbing foundry. With the help of 3-dimensional planning this foundry has done an outstanding job in improving production facilities, reduction of material handling and lowering of manufacturing costs.

In addition to the methods of layout planning, some important

hints and pointers of "do's and don'ts" are given in the following paragraphs.

If your plans include new buildings, be sure to allow for possible expansion or future changes in product and process.

Think about services and utilities required by production or handling equipment. Investigate the economies of grouping.

Don't forget the maintenance engineer. Give him adequate access to all equipment and machinery above as well as below the ground.

Make your planning a combined operation. Everybody connected with the running of a department should contribute his ideas or requirements. Only in this manner can all sides of a problem be fully understood and considered.

HOW TO APPLY THE PLAN

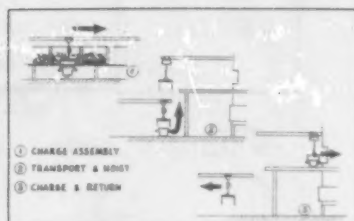


Fig. 16 Combining charging and charge make-up result in new installation paying for itself within just one year.

Efficient use of space gives compact and orderly layout to molding floor at Cutler Hammer foundry operations.

In the following pages several interesting applications of layout planning are described and illustrated. Some of them contain "before and after" illustrations which indicate clearly the outstanding improvements which can be obtained by following the principles of

sound planning of foundry layout.

The first application comes from a foundry yard and deals with charge make-up and charging operations. This foundry wanted to retain hand charging but planned to reduce the approximate 32 man-hours per day required for an av-

erage 20-ton heat production.

Following a study of the sequence of charge make-up and charging, a simple procedure was devised combining the operations.

This procedure, illustrated in Fig 16, shows schematically the procedure now followed. Charge

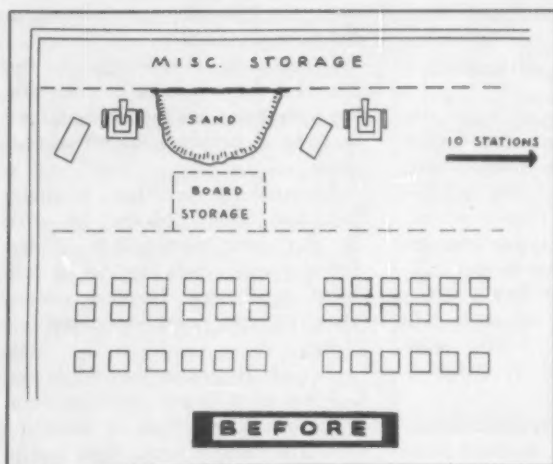


Fig. 17 Typical arrangement of non-mechanized squeezer floor shows inefficient use of space.

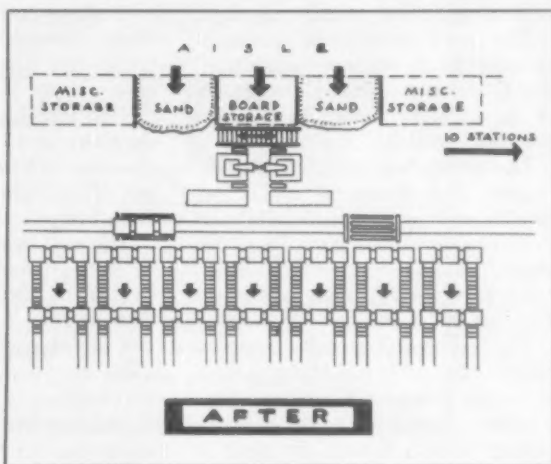


Fig. 18 Operations have been improved by cutting excessive time losses in sand and mold handling.

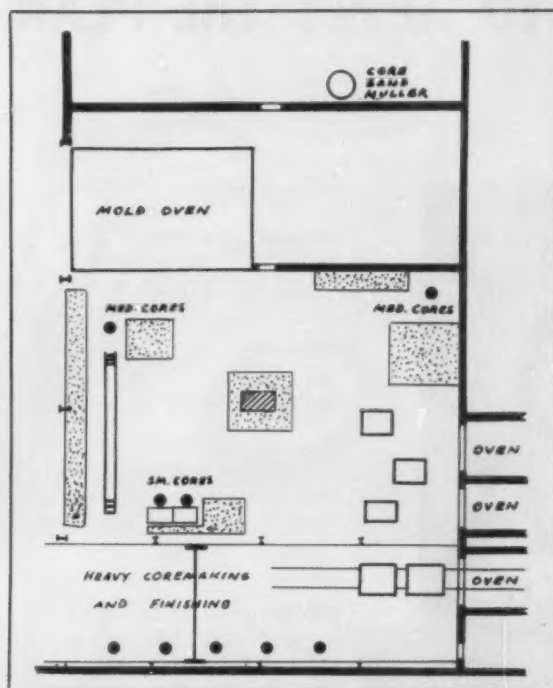


Fig. 19 Previous core room layout suffered from limited access and available work space.

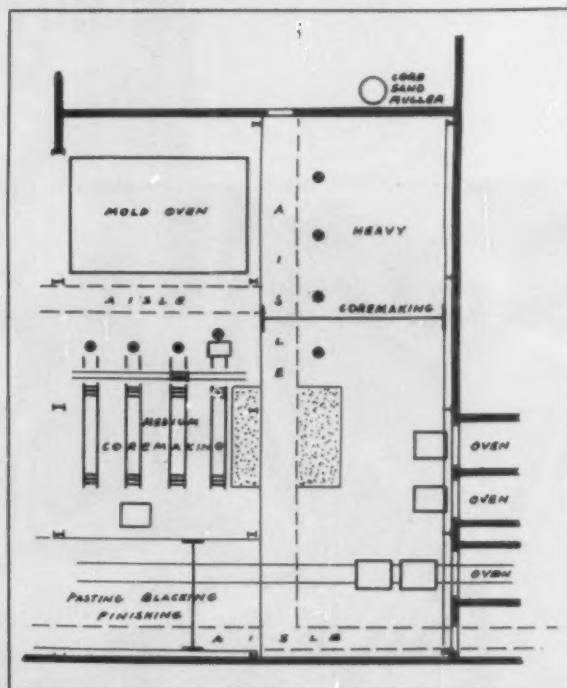


Fig. 20 Installing handling equipment and relocating bins has streamlined operations.

components are raked from elevated bins into charge boxes suspended from a scale. The box travels to the cupola platform on a monorail where it is hoisted and positioned in front of the cupola, ready for charging.

The cost of this installation was recovered in approximately one year from labor savings alone.

The next installation describes changes in a squeezer operation. Fig 17 shows a typical arrangement of a squeezer floor, completely non-mechanized.

Layout studies revealed the excessive time losses in mold and sand handling. Although overhead sand supply would have been desirable, it was decided to concentrate as a first step on mold and equipment handling. (Fig 18).

On previous page note compact efficient layout of this molding floor at Cutler Hammer Foundries, Milwaukee. Molds are stacked on rolling bottom boards. At right is mold shakeout onto magnetic belt feeder supplying elevator. Sand is dumped through vibrator screen

into bin from where it is conveyed to a revivifier (right rear) and then returned to a point between the two molders. Also note the simple mold conveying technique being used.

Fig 19 shows the changes in layout which, apart from relocation and bins provided good access to all stations and reduced mold handling through the use of roller tracks and transfer cars in another case.

This foundry enjoyed high productivity even before the layout changes, but further boosted output of individual squeezer molders from 10 to 15 per cent.

The next example shows changes of methods and layout in the making of medium and heavy cores. The original layout, illustrated in Fig 20, restricted to a bare minimum the work area available to coremakers.

Much of the floor space was taken up by core boxes, finished cores and miscellaneous storage and the resulting handling difficulties became costlier with increasing pro-

duction from this area.

A revision of the layout is shown in Fig 20. This improvement included a larger heavy coremaking area, the provision of service aisles for sand and core box distribution, the use of roller tracks for temporary storage of medium sized cores and the installation of a small roll-over machine for coremaking in the medium range.

Particularly noteworthy is the fact that the sequence of coremaking operations has been maintained in spite of building layout restrictions.

Coremaking time has, in many instances, been reduced by over 50 per cent particularly in the heavy range, while the use of roll-over equipment boosted output over 100 per cent on repetitive items.

Fig 21 illustrates the old layout of part of a heavy molding floor. This was a problem of handling and distributing cores, flask equipment and patterns. Considerable difficulties were encountered in finding adequate crane service.

Fig. 21 Inefficient use of crane and service aisles led to excessive delays in heavy molding department.

Through a change in layout and provision of adequate service aisles, many of the handling problems were satisfactorily solved. Crane delays were almost completely eliminated and delays in production, which frequently exceeded 20 per cent of a man's time, were reduced to acceptable limits.

The improved layout shown in Fig 22 did not involve any capital expenditure and boosted individual output by more than 25 per cent in many cases.

In the next example, a similar condition of excessive delays in the operation of a cleaning room could be attributed to a poor layout, which is illustrated in Fig 23.

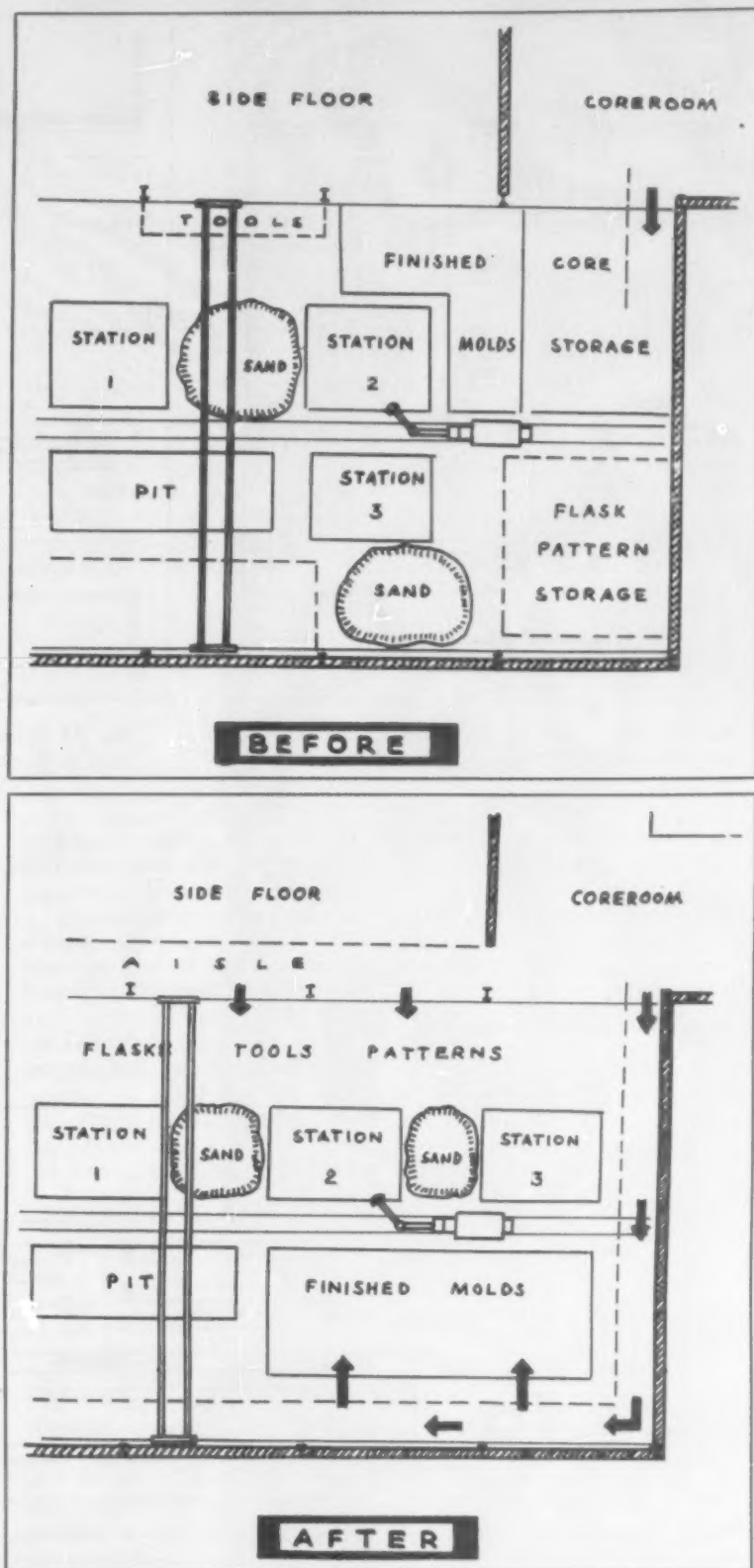
The rearrangement of the work areas was carried out to provide a step-by-step processing of castings of heavy, medium and light weight. The sequence of operations was maintained in the layout of the equipment, thus reducing to a minimum the handling requirements during and between processes.

The revised layout which is shown in Fig 24 also illustrates the service aisles which were important to keep the product on the move once the process had started. Other improvements include the relocation of the tumbling blast barrel, the installation of a continuous sorting belt and a small overhead crane.

Capital expenditures were small and paid for in less than a year by labor savings and overtime reduction.

Fig 25 is another core room installation, of particular interest in view of the good flow features for both large and small cores. The flow lines on this illustration show again the incorporation of operating sequence into the layout.

Fig. 22 Individual output was increased without cash outlay by making efficient use of existing facilities.



HOW TO IMPROVE FOUNDRY LAYOUT

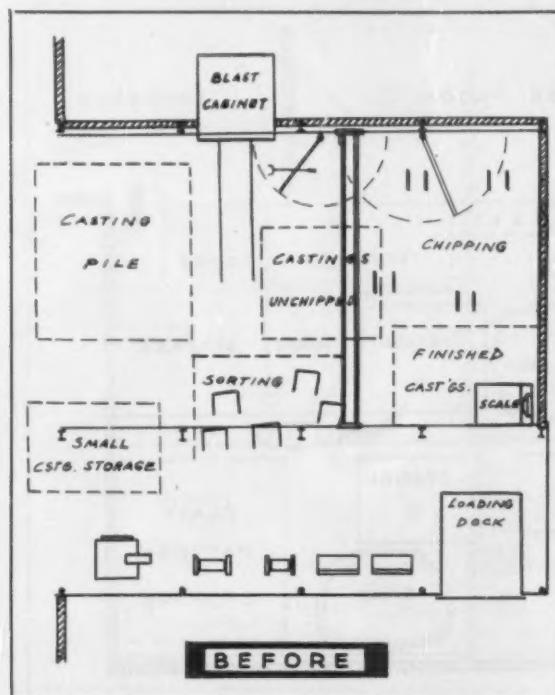


Fig. 23 Poor layout of floor space resulted in excessive production costs in the cleaning room.

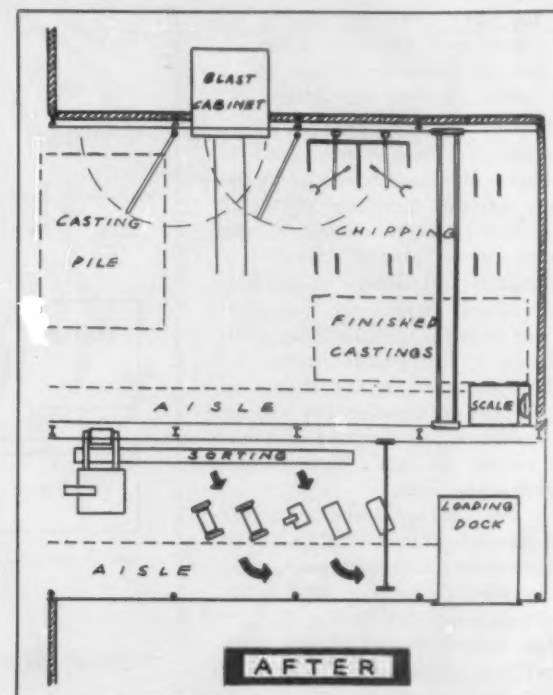


Fig. 24 Better use of service aisles kept the product in motion once processing had started.

One particular feature of interest in this layout is the large core oven, which by its location and provision with doors at either end can be used to serve the core room during the day and the foundry during the night.

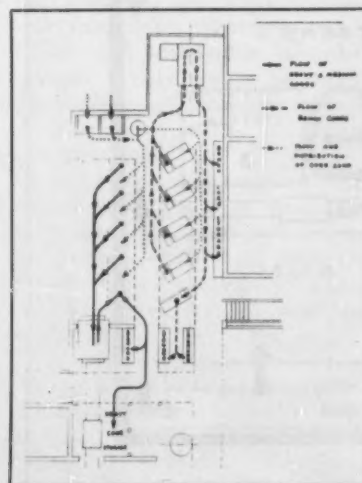


Fig. 25 Sequence and flow are needed for efficient operation.

Fig 26 is yet another illustration of a well planned cope and drag bumper set-up, to work in conjunction with a roll-over machine.

The flow lines for both materials and product indicate well the many advantages obtained from a layout of this kind.

All in all, layout study and improvement, such as that demon-

strated here, has become an essential part of management's task in running a profitable foundry operation.

In addition to the efficiency gained by layout study, however, there must be included the continuous improvement of operating facilities in line with product changes and advancement in methods.

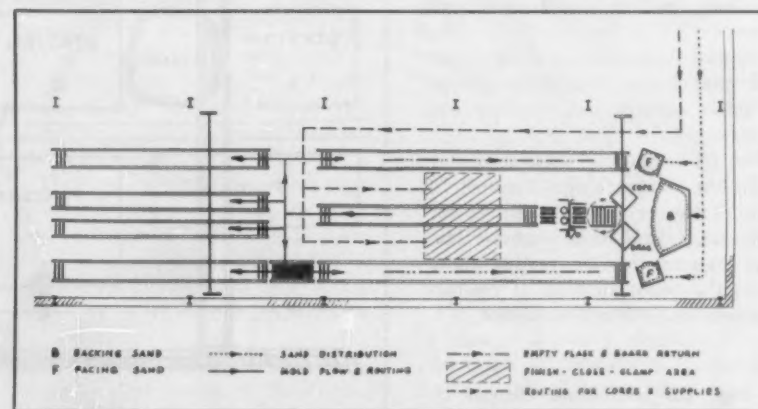


Fig. 26 Flow lines of materials and products in cope and drag bumper set up show advantages to be gained with planned layout.

Has Santa received his Christmas list from your kids? Does it include a toy car, truck or airplane? If that list includes a toy car, truck or airplane with a bright coat of paint and made from metal for a longer "play-life" chances are that it was made in Chicago by Dowst Mfg. Co.

Millions of toys—more cars than made in Detroit, more planes than turned out by all plane builders, and more buses than Greyhound ever saw—are cast yearly by the makers of Tootsietoys.

Now the largest manufacturer of cast metal toys in this country, Dowst started in 1876 as publisher of the *National Laundry Journal* and producer of collar buttons and laundry accessories. After seeing a new type-casting machine at the World's Columbian Exposition in 1893, a partner in the firm saw the possibilities of casting novelties from lead or type-metal. The first toys produced were trinkets for prizes in penny packages.

Dowst now employs 350 people in two shifts working in a 80,000 sq ft, one-story plant built for the company in 1954.

The toys produced range from semi-trailers and logging trucks to dream cars and jet planes. Most toys are sold from July through November but the plant operates at a steady pace the year around. Retail prices for the toys range from a dime to \$3.00.

Dowst's facilities consist of eight standard hot chamber die casting machines and 12 smaller, high speed machines designed and built by the company. These smaller machines handle 750 shots of metal per hour as compared with 250 shots for the standard machines.

On the small, custom built machines, Dowst casts such items as road signs, ladders, badges and small components. Radio and television parts are also in production on these machines. Each casting may include six or more different parts attached to one gating system. Parts are broken from the gates by hand, eliminating the need for trimming dies.

Production is confined to a 97 Zn, 3 Al alloy which is cast at 800 to 850 F. Although there is a trend to plastic toys, Dowst has concentrated on durable, metal toys. As a

Castings for Kids— by the Millions

GEORGE A. MOTT /
Assistant Editor

result of the firm's ability to mass produce small rugged parts, it has also been able to increase its jobbing production.

After casting, toy parts are cleaned with equipment that includes three large barrel machines and five smaller ones. Various dry deburring, cleaning and polishing compounds are used in some operations while in others the parts are just tumbled together.

Design work on toys starts months ahead of production. Because of this, no attempt is made to copy current auto models. However, attention is paid to the trends and cars are constantly being re-designed. Other toys in the line are also changed but revisions are not a major problem in such items as tractors, trucks and trains. Frequently the complete line is reviewed and such items as doll furniture have been discontinued.

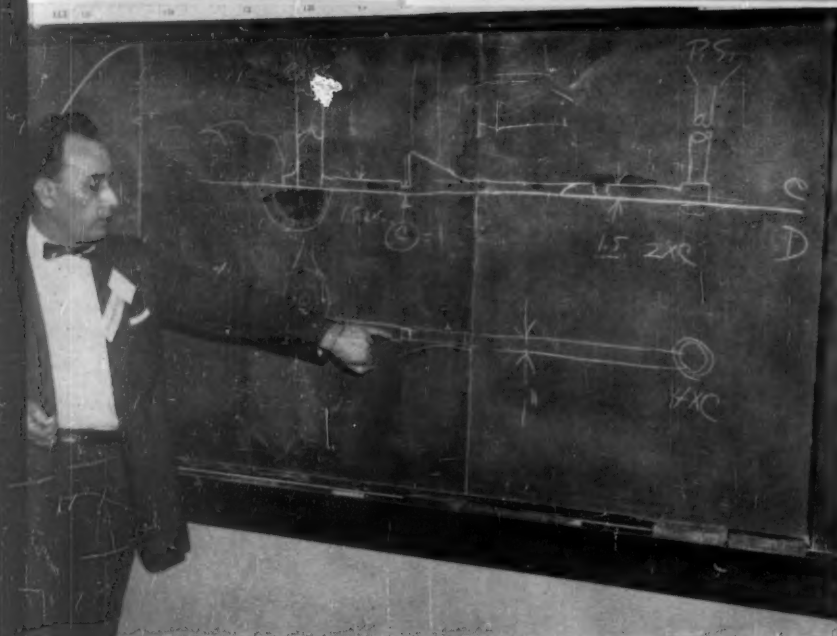
Toys get their bright coats of shining paint in two paint spray booths where a water screen is used to control and recover wasted paint. A unique feature of this operation is that six colors are always available to the painter. Colors are mixed at a central station and are piped to the operator. All paints are non-toxic.

An unusual situation exists in color selection. Because the rainbow hues now in vogue for Detroit-type autos look washed-out on the toys, Dowst favors a combination of bright red and green for its juvenile motorists. More than 50 per cent of the paint used is bright red. When three colors are needed to duplicate current auto styling, the predominant color is applied first and the toy is then placed in special masking features and the remaining colors are applied in a few seconds.



Quick color switch speeds production.

Casting contains bus, tractor parts.



Author Charles V. Knobloch, foundry engineer, R. Lavin & Sons, Inc., determines the gate area as first step in planning of the system.

Many types of gating systems are in use. Some are good, some are mediocre, and some are bad. Here is a system that has given good results with copper-base alloys in machine made and hand rammed green sand molds.

Some comprehension of the flow of fluids through tubes and orifices is vital if the mold cavity is to be filled correctly. Perhaps the quantity of metal that can be delivered from varying sized orifices, or gate entries, is of first importance. If this is known, then we have one very important factor under control. We can determine with reasonable accuracy the filling time of the mold cavity. This aids us in flowing molten metals so that directional solidification can be enhanced by allowing heavy metal sections to cool or dissipate more heat before the cavity is completely filled. Then we can accommodate the pour to help the molding sand do its job.

The physical nature of the mold to be cast is usually a definite quantity in the equation. We know, for instance, that the mold is made of green sand, either naturally bonded or compounded to formula. The physical properties of the sand are within specific limitations. Or we may be casting in dry sand, such as cores or baked sand molds, and here we are dependent upon baked

core oils, pitch, cement, and resins as bonding agents.

In the case of green sands, we must bear in mind that as the mold cavity is filled the sand which is not immediately contacted by the molten alloy is subject to radiant heat. Depending on the time of exposure to this radiant heat, the sand will lose a portion of its moisture by vaporization. This loss entails a small loss in green strength or bond, and if this loss is sufficient the sand is weakened to a point where it will wash or even break off when some of the sand sections are thin or feather edges exist. When this occurs, casting surfaces are defaced, and loose sand grains are generally scattered over the finish.

This type of difficulty is not usually encountered with the dry sand molds. They can generally stand even an abnormally long filling time that is sometimes caused by equipment failure or gross quantities of metal to be cast in a single mold cavity.

When filling green sand molds with brass and bronze alloys, and the section sizes to be cast are not excessively thin (say over an 1/8 in.) with casting weight under 300 lb, a filling time of 15 to 45 sec has been found quite satisfactory. This first of all fills the mold cavity at low flow velocities, produc-

CHOKE THAT GATE

By using set ratios you can balance flow throughout the system

ing minimum turbulence, hence no dross or oxides. Second, sand wash and mold break-offs are nonexistent or reduced to a negligible quantity, since fast moving heavy flooding action against thin sand walls cannot take place.

Third, cold shuts, laps and shot are eliminated. This is best visualized by considering the mold cavity to be a semi-porous pneumatic cylinder, and the incoming metal as a liquid piston. For the liquid metal to flow into and fill the mold cavity, it must displace all of the contained atmospheric air, plus all of the gases that are being generated by the action of heat in the liquid metal on the sand constituents. These gases exit through the risers and vents freely until they are shut off by the rising liquid level. The remaining pockets, generally in the cope, can only exhaust through the sand.

Herein lies one of the sources of

trouble. Quite frequently the permeability of the sand is insufficient to carry off the compressed gases as rapidly as is required by the incoming liquid metal, so that liquid metal flow is retarded and gases and molten metal become intimately mixed. If the time during this condition is sufficient (and it often is), partial solidification takes place and the viscosity of the cooling metal is increased, trapping the mixed gas bubbles and allowing oxide films to form. This causes laps, creases, and spotty pinholing, which becomes apparent usually when the cast surface is removed by machining.

Fourth, the thermal shock induced in the molding sand is reduced by slower filling and any tendency for the sand to spall or crack off from this cause is retarded, thus reducing the occurrence of rat tailing or cracking.

There is a very simple way to

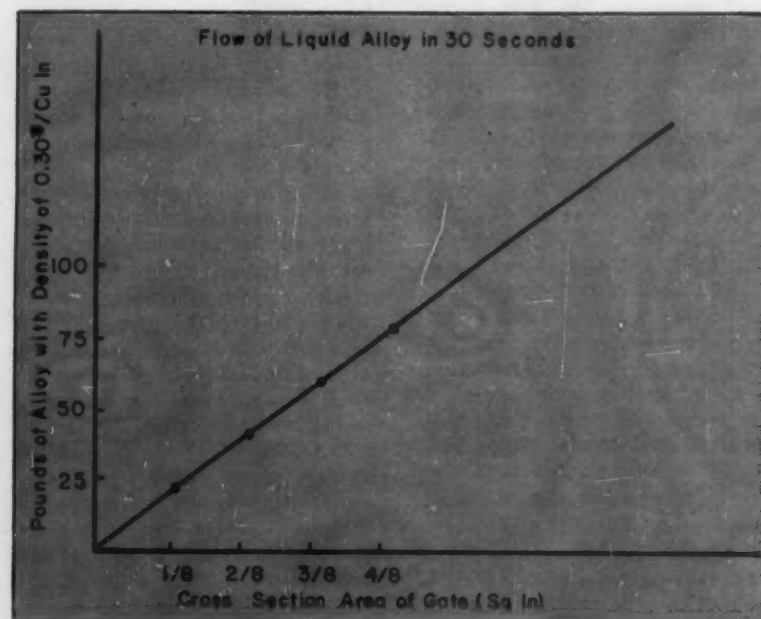


Fig. 1 . . Gate area is easily found by knowing weight to be poured.

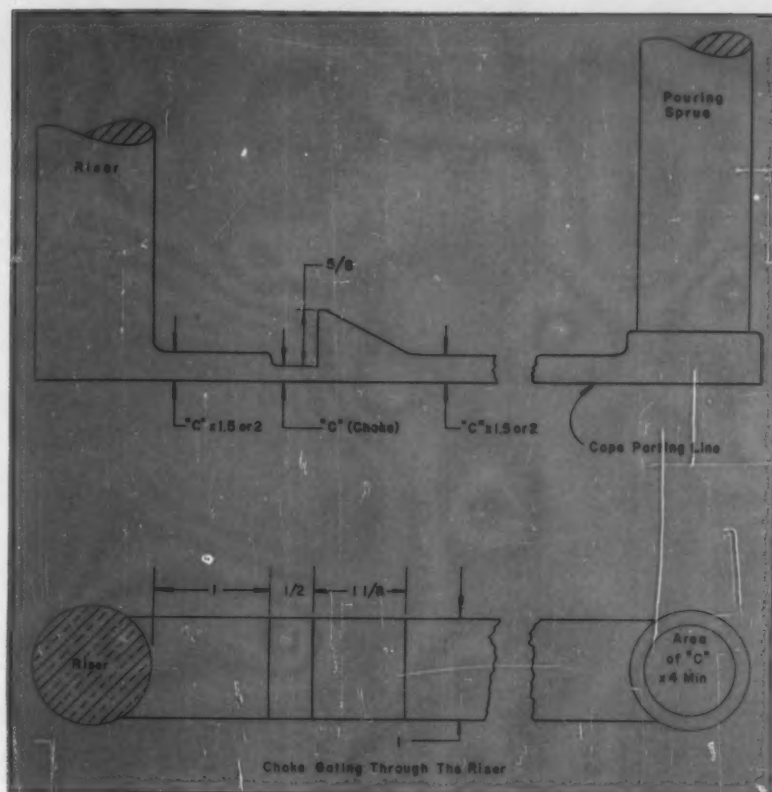


Fig. 2 . . Gating system should be as automatic in control functions as possible to eliminate variables found in pouring operations.

determine with reasonable degree of accuracy the gate area required to fill a mold cavity in a given period of time when the weight of metal to fill the mold cavity is known, since all the other factors are reasonably constant. Simply divide the weight to be poured in the mold (in pounds) by 25. This gives the number of 1/8 sq in. of gate area required for a 30-second filling (Fig. 1).

Knowing the total gate area required, we can plan the gating system. A gating system should be as automatic in its control functions as possible. Then it will give uniform filling from mold to mold and eliminate the variable that the pourer can introduce when he changes his pouring technique from flask to flask.

Since the flow of molten metal through a specific cross sectional area is relatively constant, this orifice, or choke, serves as a pouring control to produce the desirable qualities, provided it is supplied

with sufficient molten metal, the pouring pressure or hydraulic head is reasonably constant, and facilities for collecting scavenged non-metallics is provided. Fig. 2 shows the principles and proportions involved in a gating system that will do these things.

The choke at C is the focal point of the entire system of fluid metal flow. This is the calibrating orifice that controls the rate of flow as determined from the flow diagram. The balance of the gating system is simply a series of tubes designed to supply this orifice area with a sufficient or slight excess of alloy so that the choke will never run dry or be underfed. The proportions of the runner between the pouring sprue and the choke should be larger than the choke area, since it is the supply line from the pouring ladle to the controlled orifice area; so it must, of necessity, be larger in cross section than the choke.

A good ratio is, at least, 1-1/2

or 2 times the choke area. This assures the choke of a constant supply of metal, provided the pourer does not pour metal at a slower rate than the capacity of the choke. The projection above and directly before the choke is simply a small reservoir to enable metal and non-metallics that first reach the choke to be skimmed out of the flow path. The runner area between the choke and the riser connection is larger than the choke area to reduce the velocity of the fluid metal before it reaches the casting. Therefore, the area of this runner will have to be larger than the choke area, and the same ratio of 1-1/2 to 2 times the choke area is generally sufficient.

This type of flow control can often be used to advantage when the horn type gate is required and the smaller diameter of the horn is under 5/8 in. in diameter. Normally when such a small diameter is encountered the hole remaining in the sand is usually damaged slightly and enlarged after the horn has been withdrawn. This rough edge is generally touched up by hand or a small molder's tool and inevitably the controlling orifice diameter ends up being much larger, closer to 3/4 of an in., so that the control of the flow of metal is not what is desired. If the small end of the horn is located just after the choke, then the diameter of the horn becomes non-critical, since the choke will take over the job of

accurately controlling the flow of metal. When the small end of the horn gate is over 5/8 in. in diameter, this type of gating is generally not necessary since the horn alone will not be distorted enough to appreciably change the flow of metal through it.

It is important to note that the gate enters the riser. This makes the riser a live one and allows it to receive the hottest metal after the mold cavity is filled. In addition, the sand surrounding or forming the riser connection to the casting is heated more than the balance of the sand forming the mold cavity. A heat dam is then built up by the flowing metal, which, in turn, aids this smaller area connection to feed hot fluid metal from the riser to the mold, even though the sectional area of the casting is larger than the connection. Also of great importance is the location of the choke in relation to the riser. It should be as close to the riser as is practical, since it is the cleaning area. The metal should be clean just before it enters the riser and the mold cavity. Locating the choke too far away from the riser enables eroded sand to get into the mold cavity from the runner connecting the choke to the riser, and subsequently into the casting.

It is advisable to use small radii on all of the edges of the runner system and gate to avoid feather edging of the sand. The shape of the runner and choke is important.

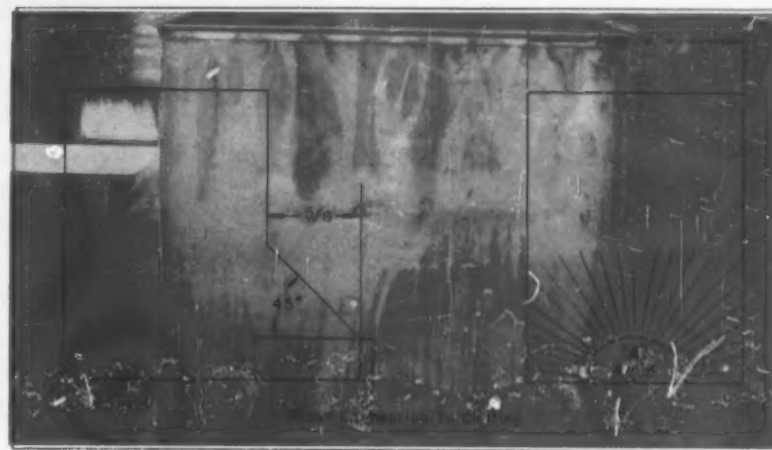


Fig. 3 . . Riser size is based on yield factor for particular alloy.

inasmuch as this system should float out as much nonmetallics as possible before entry into the riser and mold cavity. Hence, the gate is low and wide, allowing the greatest area for this flotation to take place.

The gating system is located in the cope of the mold, and the drag is relatively a flat back. This serves a useful purpose when the mold cavity is confined to the cope; it permits filling the mold from the bottom and reduces turbulence such as is produced by dropping the metal into a drag cavity. This is not always applicable to certain types of castings. However, for the type casting under discussion this system can generally be used.

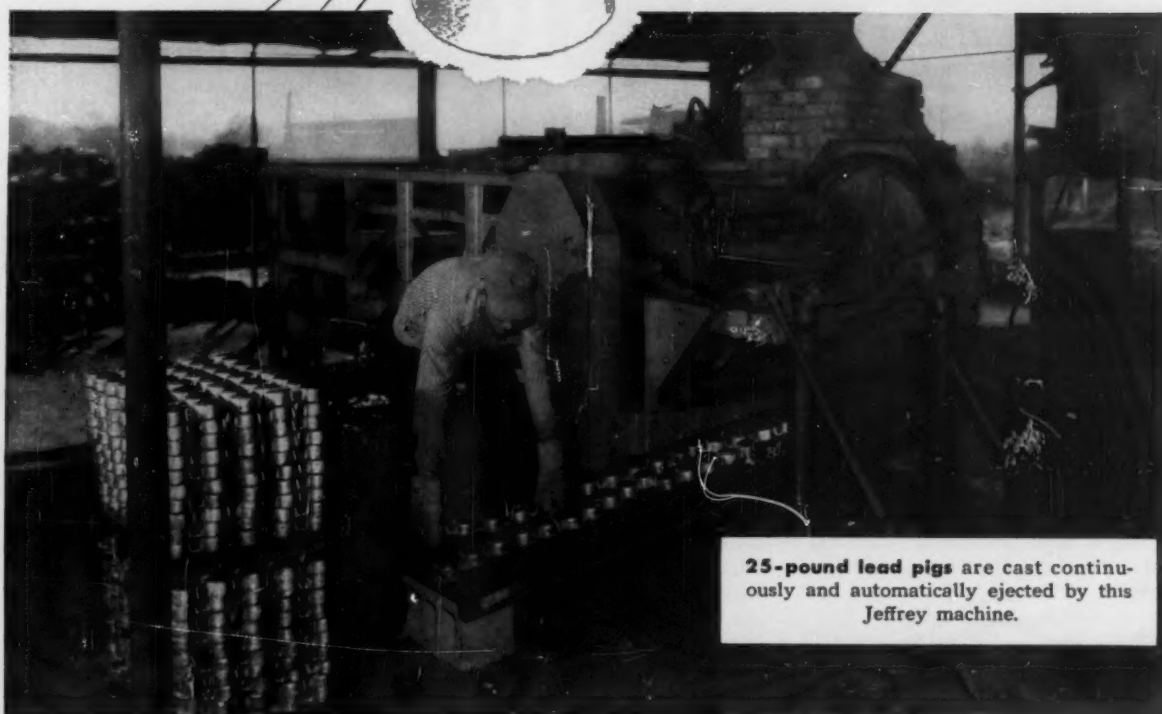
The construction of the riser and its connection to the casting is of importance, since it is the connecting area which feeds fluid metal from the riser to the solidifying casting. The form and size of the connection will vary with the changes in shape from one type of casting to another. However, good basic design is the one shown in Fig. 3.

The connector itself will generally do a good feeding job if the area of the connection is between $1/4$ and $1/5$ of the cross sectional area of the riser for example, if the riser is 2 in. in diameter then its area will be 3.1416 sq in. in area. The connecting area will then be between 0.628 and 0.785 sq in. in area. From this point back the distance to the riser should be at a minimum commensurate with molding and cut off practice, and the area should be faired into the riser at approximately 45 deg.

The size of the riser or risers for the casting is generally based on the yield factor that is inherent for the alloy. For instance, the red metal groups for average castings will run about 80 per cent yield, and those for manganese bronze and aluminum bronze, the high shrink alloys, will run about 50 per cent. Therefore, on a red metal casting weighing 80 lb the weight of the risers should be approximately 20 lb, and in the case of manganese bronze the weight of the risers should be 80 lb.

A Bibliography on Gating and Riser has been prepared by AFS and may be purchased from MODERN CASTINGS.

JEFFREY puts pig casting on a profitable basis



25-pound lead pigs are cast continuously and automatically ejected by this Jeffrey machine.

Jeffrey pig casting machines put this operation on a straight line basis, automatically emptying the molds after the metal has solidified. Production proceeds at a constant, rapid rate requiring a minimum of labor.

Aluminum, magnesium, lead and brass are among the metals being cast in Jeffrey pig casting machines. Designed to meet each company's exact requirements, they assure that this operation is most profitable.

For help on this or any foundry problem,

Jeffrey engineers will assist you in selecting equipment for most efficient performance. The Jeffrey Manufacturing Company, Columbus 16, Ohio.



CONVEYING • PROCESSING • MINING EQUIPMENT • TRANSMISSION
MACHINERY • CONTRACT MANUFACTURING

Gray iron melted in induction furnaces has upgraded the quality control at Commercial Shearing and Stamping Co., Youngstown, Ohio. This producer of hydraulic equipment has been able to improve its competitive position through its ability to produce gray iron and alloy iron castings using a sharply limited floor area.

In 1954, Commercial decided that it could improve its quality control by replacing purchased castings with those of its own production. However, the company could not afford to offset the advantages gained in quality control by turning over a large area of its badly needed floor space to castings production.

Chief engineer T. C. Kane ex-

plained that, "We had to come up with a good answer to the increased demand for quick in-plant delivery of quality castings for hydraulic pumps, motors, and cylinders. Our customer demand necessitated improvement in our delivery schedules and we couldn't afford to lag."

and are all components of hydraulic assemblies. The plant reports a significant improvement in its castings over purchased castings. Castings now being produced with shell molding and induction melting are said to have reduced machining operations, and to have upped the tensile strength of alloy castings from approximately 35,000 psi to 50,000 psi, while producing a substantial savings in the cost of castings.

To maintain quality and establish start-to-finish control of melting and molding operations, the plant installed two 300 lb induc-

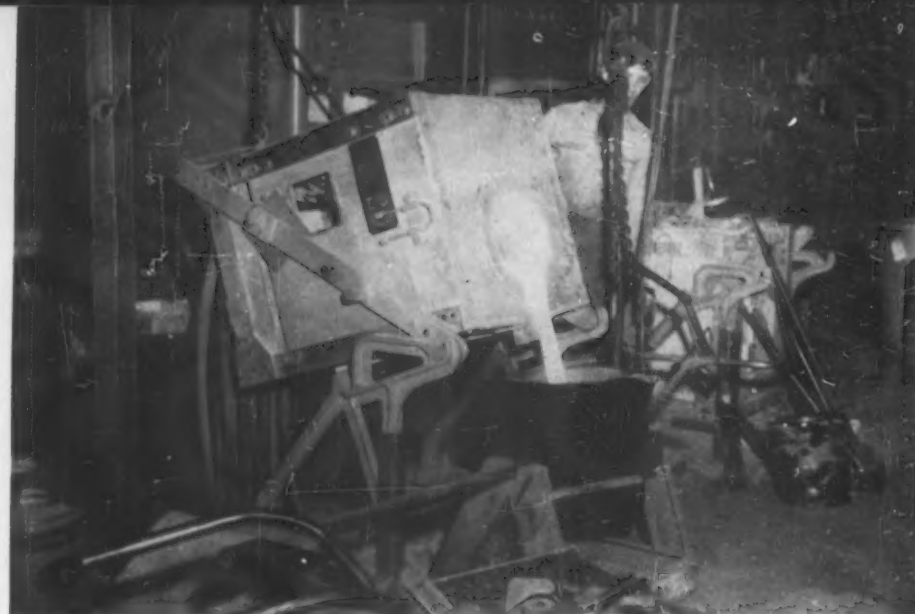
tion melting furnaces operating alternately from a 200 kw, 3000 cycle motor generator set. Complete with a shell molding line, the operation occupies only 5000 sq ft in the plant.

The two melting units deliver 600 lb per hour, and are now being operated on an 18-hour day. Two additional furnaces have been added, bringing the operation's melting capacity to 13,000 lb per day.

Castings being produced at Commercial range from 0.5 to 35 lb

RATIO OF RAW MATERIALS CHARGED

	Pig Iron	Scrap Iron	Scrap Steel
#1 Mix	67%	20%	13%
#2 Mix	58%	30%	12%
#3 Mix	42%	50%	8%



Iron from their own furnaces—Commercial's answer to competition.

INDUCTION MELTING PUTS FABRICATOR INTO GRAY IRON PRODUCTION

DR. H. B. OSBORN / Technical Director
Ohio Crankshaft Co.

Quality is up, production costs down
as Ohio firm begins producing castings

CHEMICAL ANALYSIS OF MATERIALS USED

Pig Iron	Burn Off	Scrap Iron	Burn Off	Scrap Steel	Burn Off	Ferro Silicon	Burn Off	Ferro Moly	Burn Off	Copper Shot	Burn Off
3.90 C	.	3.25 C	.	.15 C	.	75.0 Si	4%	62.5 Mo	5%	99.5 Cu	.
1.90 Si	7%	1.90 Si	7%	.45 Mn	6%	21.0 Fe	.	37.0 Fe	.	.	.
.90 Mn	6%	.85 Mn	6%	.02 P	.	.	.	.	.	.	.
.03 S	.	.75 Cu	.	.04 S	.	.	.	.	.	.	.
.10 P	.	.50 Mo	5%	.	.	.	.	.	.	.	.

Shell molds move to the pouring station on a mobile pouring car.



Prior to installing their own foundry, Commercial consumed a lot of time with rough machining operations. Machinists in the hydraulic division often found it necessary to remove as much as a quarter-inch of stock before the finish machine operation. With the new installation castings are made so close to final dimension that rough machining is not required.

With induction melting, foundry supervisor John Hesch reports the ability to control analyses within plus or minus 0.001 per cent. Be-

cause of the "homogenizing" effect caused by the stirring action of the induction melting process, iron density has been increased considerably. The end result of this control is a lighter and more useable casting.

One of the first large producers of hydraulic equipment to operate their own foundry, Commercial Shearing and Stamping is more than satisfied with their results and plans to install 600-lb capacity furnaces to further increase their production.

WHITE IRON CASTINGS for a Black Hills

Gold Mine

LE ROY SEYHERS /
Chief Mech. Engr.
Homestake Mining Co., Lead, S.D.

Thar's gold in them thar hills, but it sometimes takes some first-class foundry practice to get it out. At the Homestake mine, Lead, S. D., the nation's largest producing gold mine, white-iron balls for the mills that crush the gold-bearing rock are now being cast in banks of water-cooled permanent molds.

The molds are arranged in two banks on the ball machine, which was designed and built by the Homestake Mining Co. When a mold in one bank is opened to remove the balls and gates, the mold in the other bank with which it is paired is closed automatically by pneumatic cylinder.

Balls pried out of the open molds drop into a chute leading to a tumbler. Discharged from the tumbler, the white-iron balls roll

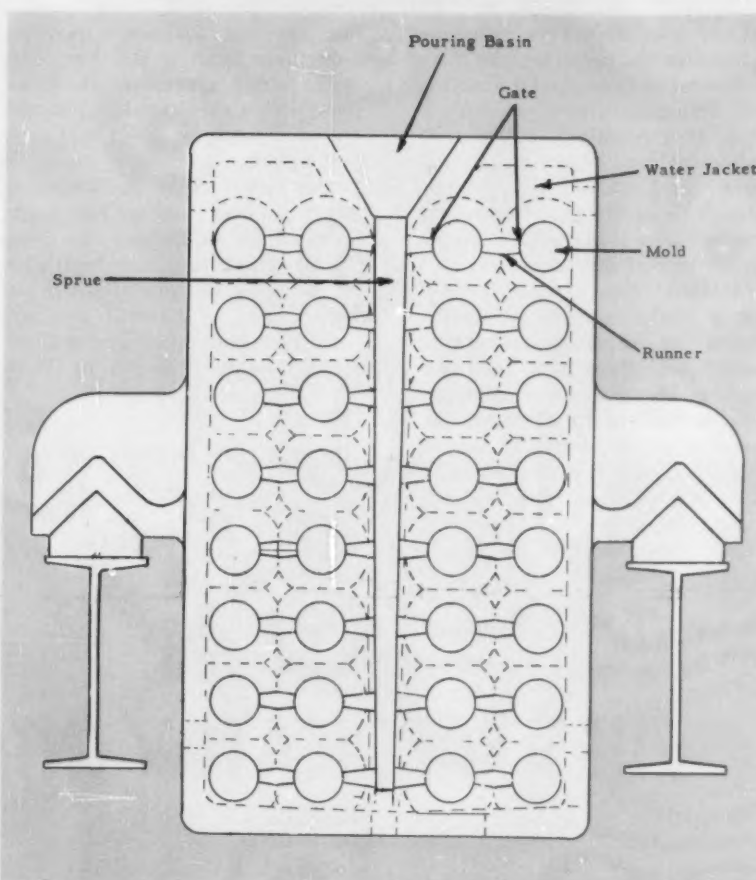
through a pipe to the ball mills where they will be used in crushing the gold-bearing rock.

Iron is melted in a 36-in. cupola. Each charge consists of 100 lb pig iron, 400 lb scrap iron, and 500 lb scrap steel. Thirty lb of limestone and 125 lb of coke complete the charge. The pig is omitted from every third charge, and 500 lb scrap iron and 500 lb scrap steel is charged.

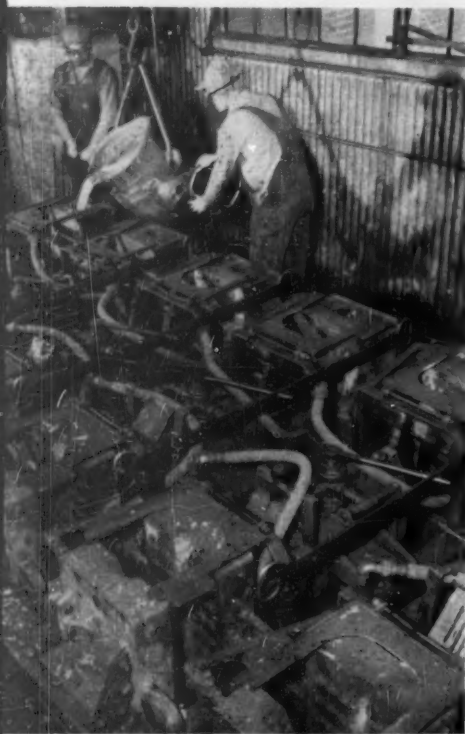
Most of the scrap steel is drill steel. The pig iron used in producing the balls has the following analysis: silicon 1.25, manganese 0.20 to 1.60, phosphorous 0.30 max, sulphur 0.065, and carbon 3.0 to 4.0.

Iron is poured between 2400 and 2700 F and 20,000 lb of finished balls are produced from each, total heat of 35,000 lb.

Balls are being cast in two sizes: 1.5 in. diam and 1.75 in. diam.

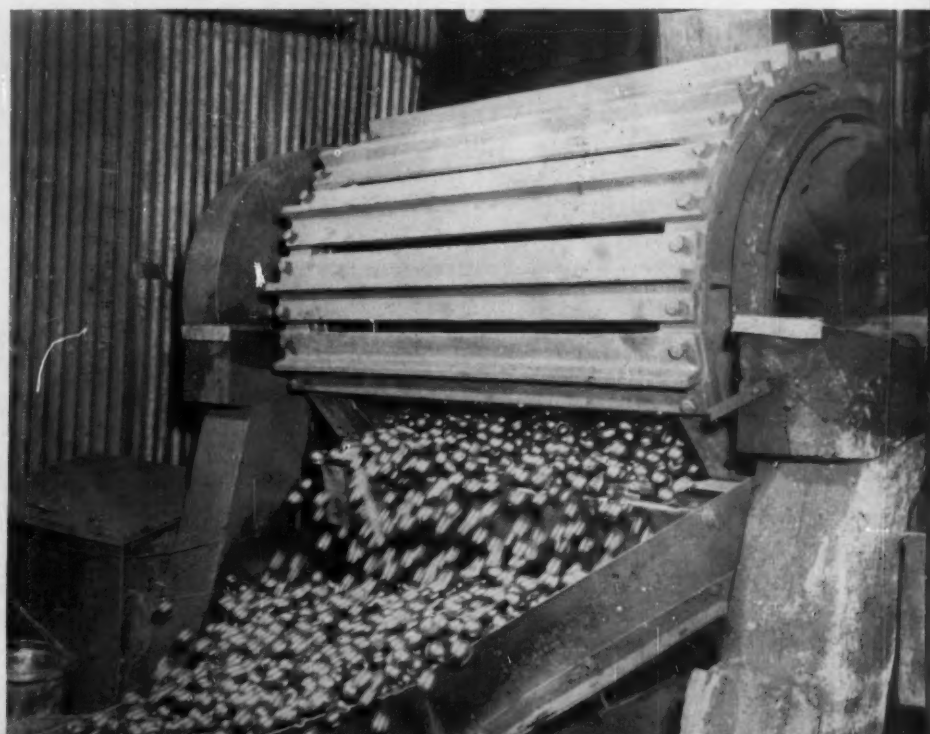


Permanent, water-cooled molds are used in producing white iron balls used in crushing gold-bearing rock in nation's largest gold mine.



Drill steel is main source of scrap metal, pouring is done between 2400-2700 F.

Balls are pried out of open molds and drop into tumbler then run through a pipe to mills for use in crushing.



foundry trade news

Pangborn Corp. . . has signed a licensing agreement with Hepburn Conveyor Co., Ltd., Wakefield, England, for sole manufacturing and sales rights of Pangborn equipment in England, Scotland, Wales, Ireland, Australia, New Zealand, and Union of South Africa.

American Society for Metals . . has announced that a 2nd World Metallurgical Congress will be held in Chicago in 1957. More than 500 metal scientists from 35 nations are expected. The first world event was held in 1951.

Ford Motor Co. . . has announced that its new aluminum castings plant at Sheffield, Ala., will produce 140 tons of aluminum engine and automatic transmission parts daily. Castings will be produced by both permanent mold and die castings.

Federated Metals of Canada, Ltd. . . has officially opened a non-ferrous metal fabricating, processing, and refining plant in Toronto and is rushing completion of a facility in Montreal. The two plants will have a combined employment of about 200 and will smelt and alloy non-ferrous metals.

Central Foundry Co. . . Newark, N. J., firm has borrowed two million dollars for improvements and modernization of its cast iron soil pipe plant at Holt, Alabama. Prudential Insurance Co. is supplying the funds

for improving these facilities of the world's largest cast iron soil pipe manufacturer.

American Brake Shoe Co., New York, and **Ampco Metal, Inc.,** Milwaukee, have joined with **J. Stone & Co., Ltd.,** of London, the British developer of a new high-strength aluminum bronze alloy, to form **Superston Corp.** This new company will produce the alloy, known as Superston 40.

American Machine & Foundry Co. . . will build a \$4 million research and development center in Stamford as headquarters for its Central Engineering Laboratories. AMF board chairman and president, Morehead Patterson, states that the site "offers the suburban atmosphere and seclusion conducive to the creative effort so necessary for research and development engineering."

W. J. Bullock, Inc. . . Birmingham, Ala., non-ferrous smelter is now packaging metal ingots in wirebound pallet bins that hold over a ton of metal. Bulk shipments have been dropped in favor of this method of shipment which is said to simplify materials handling.

Consolidated Foundries and Mfg. Corp. . . has announced formation of **Michigan Industries Co.,** a wholly owned subsidiary which will include the following firms as operating divisions: Michigan-Standard Alloy Cast-



American Machine & Foundry: seclusion for central engineering labs.

carl mayer OVENS

Engineered to Cost Less

**. . . by being more Efficient,
Much Longer!**

Our special slotted panel construction cuts heat losses yet is more rugged structurally and gives years more peak operating efficiency. Consult our engineers now for details on any type or size of industrial oven—for any purpose.



(above) Car type mold drying oven installed at Centre Foundry, Wheeling, West Virginia.



(left) Rack type Recirculating Gas-Oil Fired Core Ovens at Golden Foundry, Columbus, Indiana.

Write for Bulletin 53-CM



Federated Metals: now a plant in Toronto, soon one in Montreal.

THE **carl mayer** CORP.

1030 EUCLEID AVENUE, CLEVELAND 15, OHIO

CIRCLE NO. 143, PAGE 7-8

INJUN GAME NOT TOO TAME

(Junior's control helps make a goal!)



PRINCESS WENATCHEE:
"Another goal for Junior!
Control help him win."

CHIEF KEOKUK:
"Control? He trip me up."

CHIEF KEOKUK JR.
"Injun Lacrosse, like any game
— not too tame!"

Control can net a profitable return in Lacrosse . . . and in processing iron and steel! Foundries and steel plants everywhere control costs and quality with Keokuk Silvery Pig Iron . . . the superior form of silicon introduction. Pig for pig, car for car,

its uniformity never varies. Handle it by magnet . . . charge it by weight (or count the piglets for equal accuracy). Leading aluminum producers specify Keokuk Silicon Metal for uniform high purity. When you think of silicon, think of Keokuk!



KEOKUK

ELECTRO-METALS COMPANY KEOKUK, IOWA

Wenatchee Division, Wenatchee, Washington

SALES AGENT: MILLER AND COMPANY

332 S. Michigan Avenue, Chicago 4, Illinois

3504 Carew Tower, Cincinnati 2, Ohio

8230 Forsyth Blvd., St. Louis 24, Missouri

Keokuk Silvery Pig Iron is available in 60 and 30 pound pigs and 12½ pound piglets . . . in regular analysis or alloyed with other elements to match your requirements.



CIRCLE NO. 156, PAGE 7-8

ings Co., WaiMet Alloys Co., Western Foundry Co., M. S. Machine Products Co., and Misco Fabricators.

Ampco Metal, Inc. . . was able to increase their regular quarterly stock dividend effect with the fourth quarter, despite their plant explosion October 8 (see album.) Firm's net sales for the first nine months were over 10 million dollars.

American Fdy. and Machine Co. . . Salt Lake City gray iron foundry has joined American Foundrymen's Society.

Lindberg Industrial Corp. . . is now building 14 aluminum reverberatory type furnaces for the Ford aluminum castings plant at Sheffield, Ala. The furnaces are so large that they must be constructed at the plant site.

Link-Belt Co. . . has moved its Cleveland office to a new building at 3592 Lee Road, Cleveland 20, Ohio.

Jeffrey Mfg. Co. . . Columbus, Ohio, manufacturer has opened a warehouse at 1862 Rollins Road, Burlingame, Calif., to serve its distributors in western states.

Mainland Foundry . . Vancouver, B. C., gray iron foundry has joined American Foundrymen's Society.

Canadian Steel Foundries (1956) Limited . . is new name of the Steel Foundry Div., Canadian Car & Foundry Co., Ltd. New organization is a separate corporate member of the A. V. Roe Canada Ltd. group.

Dike-O-Seal, Inc. . . Chicago company has offered to dike any core box used for instructional purposes by foundry labs in high, trade and vocational schools and colleges.

Duramold Castings, Inc. . . Mishawaka, Ind., has joined Non-Ferrous Founders' Society.

International Minerals & Chemical Corp. . . will build new general head-quarter offices in Skokie, Ill. Cost of the new facility will approximate \$3.5 million.

Herman Pneumatic Machine Co. . . has increased the territory represented by Edwin A. Swensson Co., Detroit, to include most of Ontario.

Gaines Co. . . Los Angeles organization has moved its foundry to new and larger quarters at 7903 Industry Ave., Rivera, Calif. Organized in

1950, the company is now one of the largest producers of air frame castings.

Grindle Division . . C. O. Bartlett & Snow Co.'s Grindle Division formerly located in Harvey, Ill., has been moved to the firm's main headquarters, 6200 Harvard Ave., Cleveland 5, Ohio.

Peerless Pipe & Fdy. Co. . . Anniston, Ala., gray iron foundry has joined American Foundrymen's Society.

Hooker Electrochemical and Oldbury Electro-Chemical firms have consolidated.

Clark Equip. Co. . . has opened a Chicago sales and service branch at 625 North Kedzie Ave., Chicago, Ill.

Electro Refractories & Abrasives Corp. . . has announced price increases averaging 8 per cent of crucibles and refractories of similar composition. Increase is attributed to increasing labor and material costs.

Bohnert Equip. Co., Inc. . . is new Baker-Raulang materials-handling truck distributor at 104 W. Main St., Louisville 2, Ky.

Neville Fdy. Co. . . gray iron plant in Kansas City has joined American Foundrymen's Society.

Chain Belt Co. . . Milwaukee firm has purchased General Road Machines, Inc. of Niles and Newton Falls, Ohio, and will operate the firm as a wholly owned subsidiary.

Waterbury Farrel Foundry & Machine Co. . . Waterbury, Conn., firm has elected F. S. Van Valkenburg as chairman of the board and has named A. D. Mitchell as president.

New Haven Malleable Iron Co. . . New Haven, Conn., malleable plant has joined American Foundrymen's Society.

Knute Palmquist Foundry, Inc. . . Oakland, Calif., plant has been awarded a safety award certificate by its insurance carrier for its accident prevention record.

Lansco Die Casting Co. . . die casting firm at El Monte, Calif., has been sold to New Plastic Corp.

City Machine & Mfg. Co. . . Cleveland builder of steel mill equipment has been sold to a group of industrialists headed by T. W. Gulley.

NEW-UNIQUE!

THE HUTCHINSON SHELL MOLD MACHINE

consistently produces molds in 37 to 60 seconds

Fast

**Gas Heat
Natural or Manufactured**

Due to a unique method of hinging the investment box to the pattern carrying frame, no other shell mold machine can match the HUTCHINSON in shell mold production. For practically all patterns the total required cycle will not exceed 60 seconds . . . simpler patterns require as little as 37 seconds! Can be set for manual or automatic cycle. Available in twin sets.

Rugged

Frame is constructed entirely of all welded steel channels and $\frac{3}{8}$ " steel plate. Magnetic braking gives smooth stopping action to all major components. Stands up under hard, repeated usage as proven by years of service in our own foundry and in the field. Gives the ideal twin economies—increased production and reduction of maintenance costs.

Model No.	Max. Shell Size	Heat	Length	Width	Height	Wt.
2030	20 x 30	Gas	65 in.	58 in.	100 in.	3200
1424	14 x 24	Gas or Electric	46 in.	46 in.	90 in.	1900
1418	14 x 18	Gas or Electric	46 in.	36 in.	90 in.	1700

Electric—220/440, 60 cycle, 3 phase

Air Pressure—100 psi

HUTCHINSON SHELL MOLD CO. • ALTON, ILL.
CN-300



Accurate

Characteristics of the machine prevent ram-off or shadow. Each phase of the operating cycle can be adjusted and timed precisely to any operating requirement. Castings produced by the Hutchinson Shell Mold Machine consistently have . . .

- Exceptionally Fine Finish
- Closer Dimensional Tolerances
- Fewer Casting Defects
- More Uniformity

For more details on how SHELL MOLDING can help you . . .

MAIL THIS COUPON

To E-85-86
HUTCHINSON SHELL MOLD COMPANY
 413½ ALBY STREET • ALTON, ILLINOIS
 Yes—I would like you to send me your brochure "SHELL MOLDING".
 Name _____
 Company _____
 Address _____
 State _____

CIRCLE NO. 173, PAGE 7-8

First with — BETTER METAL ABRASIVES FOR Blast-Cleaning



NOW IN
50-LB.

Double
Burlap
BAGS

Sold and
Recommended by
PANGBORN
CORPORATION
Hagerstown, Md.

For 70 years Pittsburgh Crushed Steel Company has developed better metal abrasive through exhaustive research and has maintained its leadership by continuing research and improvement.

A complete line of steel malleable and standard chilled iron shot and grit.

- **Samson Shot and Angular Grit** — The original chilled iron metal abrasives that led to the conversion from sand to metal abrasives for blast cleaning. Still accepted today as the best.
- **Malleabrasive** — The original patented malleablized type of metal abrasive of greater toughness and longer life. Still leads the field.
- **Tru-Steel Shot** — The original super-tough, heat-treated and drawn shot of tool steel quality. Now the pace setter in production of the all-steel type of shot.

Packed in handy 50 pound reinforced burlap bags — easy to handle — speeds unloading of truck and handling within the plant.

PITTSBURGH CRUSHED STEEL CO.

Arsenal Station, Pittsburgh 1, Pa.

Globe Steel Abrasive Co.
Mansfield, Ohio

Subsidiaries:
Steel Shot Producers, Inc.
Butler, Pa.

METAL ABRASIVES FOR EVERY NEED

the SHAP. of things

safety, hygiene, air pollution

by HERBERT J. WEBER

Nodular Iron and Nodular Lung Shadows

Many years ago I became acquainted with a compensation case for silicosis. The claimant's chest x-ray showed the usual nodular-like shadows typical of silicosis. Even though this man worked in the foundry cleaning room where the exposure was principally to iron oxide, he was awarded total permanent disability on the basis of the x-ray picture alone.

Some years later the man died and an autopsy was performed. His lungs showed no evidence whatever of silicosis. The nodular-like shadows seen in the x-ray were due to iron-dust deposits in the lungs. Iron dust in the lungs is radio-opaque and will show on x-ray nodular-like shadows very similar to those seen in a silicotic lung.

The medical term for this phenomenon is siderosis—a pigmentation of the lungs due to iron dust. Now siderosis may be compared to a tattoo mark on the arm—it is permanent but it is nondisabling. Just as the tattoo mark does not impair the function of the arm, so siderosis does not impair lung function.

Siderosis is frequently confused with silicosis because diagnoses are often based on x-ray findings alone. I know of a welder whose doctor told him he had silicosis because the welder's chest x-ray showed these nodular-like shadows. The doctor never troubled to find out that the man welded clean steel bars and had never been exposed to silica dust. The welder couldn't have silicosis unless he was exposed for a long period of time to sufficient atmospheric concentrations of free silica. Worse, the man was told to give up his trade and seek other employment, and he would probably be barred from other jobs. That man had no more silicosis than I have.

Another bad result of such faulty diagnosis is the anxiety inflicted on

the man and his family. How would you feel if you, a perfectly healthy man, were told to change jobs and get ready for the end! I know how it feels because I was told the same thing twenty years ago.

Differential diagnosis of x-rays must be supported by *quantitative* evidence of significant atmospheric exposures. Unless the diagnosis can be supported by a *quantitative* history of exposure, in my opinion, it is suspect. I say *quantitative* because the fact that a man worked in a foundry does not mean he has had a sufficient exposure to silica dust to produce silicosis.

In spite of all this, compensation payments for nonexistent disability due to siderosis are still being made today.

In foundry practice, siderosis is more apt to occur in grinding, burning off and welding operations and then provided the ventilation system is inadequate.

Where the exposure is a mixed one, such as to both silica and iron and the nodular shadows are seen on chest x-ray, the competent physician will look for other symptoms and signs which are frequently present. They will enable him to evaluate the findings in as accurate a manner as is possible.

It should be remembered also that in the case of exposure to both silica and iron dust, the iron dust has a modifying effect on the development of the true fibrous nodules characteristic of silicosis. It is for this reason that some authorities do not recommend the use of aluminum dusting in the prevention of silicosis.

Of course proper exhaust ventilation will prevent the development of either silicosis or siderosis. But if you now have "silicotics" on your payroll, better take another look at the exposure. Maybe it's only siderosis after all.

CIRCLE NO. 146, PAGE 7-8



committees in action

The Mold Surface Committee met in Coshocton, Ohio, September 14, with seven members present. Plans were formulated for testing the resistance of sand cores to metal penetration as affected by the degree of core ramming and the pouring temperature of woods metal, iron, brass, bronze, and aluminum. Three pouring temperatures for each metal will be based on the Btu/lb/degree superheat. C. E. McQuiston plans to present a paper on "factors affecting and methods for measuring surface finish" at the 1957 Castings Congress.

The Sand Division, Program and Papers Committee met in Chicago, September 20, with nine members present. H. F. Barr, Chief Engineer, Chevrolet Motor Division, General Motors Corp., has consented to deliver the keynote address at the Annual Sand Division Meeting. It was tentatively decided to also have five Sand Sessions, a Dinner highlighted by a talk on "Shell Cores," and a Shop Course with the theme—"Controlled Sand Results in Economy."

The Sand Division Executive Committee met in Chicago, September 21, with 12 members present. A five man special committee was appointed to consider a revised Sand Division Organization Chart and submit their recommendations. E. C. Zuppann and his committee are preparing a report on "Factorial Design". The Mold Surface Committee activity is summarized above. C. E. McQuiston, Secretary of this Committee, presented a report on "Design of Experiments." A "deformation tester" is being evaluated by the Calibration-Reproducibility Committee. Three core oils are being tested for acceptability by the Bakeability Committee prior to developing a baking test for core sands. E. C. Zirzow was elected new Division Chairman and L. J. Pedicini, Vice Chairman.

The Radiation Protection Committee is now reviewing a rough draft of "Radiographic Procedures-General" prepared by Floyd Sutherland. This is being prepared as a chapter in the new Foundry Radiation Protection Manual.

FOR FASTER CURES...SMOOTHER SURFACES...BETTER CASTINGS

CATALIN SHELL MOLDING RESIN 9616



View of automatic shell mold machine, indicating shell ejection operation, shown to left... And a typical shell mold specimen, shown below... were photographed at the foundry of C. A. Goldsmith Company, Newark, N. J.

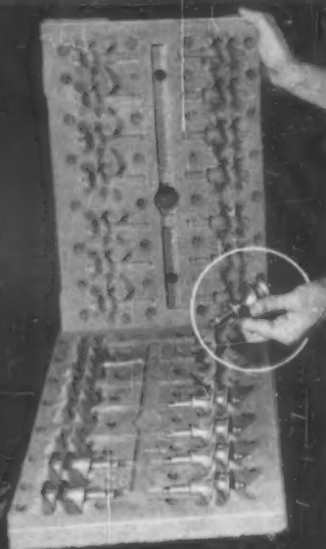
Higher production rates, new advanced techniques and automatic equipment, smoother and more accurate castings are the direct industrial contribution of the shell molding process... yet without fast-setting phenolic resins to bond the sand, the entire process could never have been possible! Since first introduced, too, shell molding resin formulations have also undergone self-transition periods of change and betterment.

Today Catalin Resin 9616, a two-stage, powdered phenol-formaldehyde resin, emerges as the very latest and best type of formulation.

This economical resin produces high-speed curing rates with the minimum of resin content. Savings are achieved in time, sand, work space, handling and metal. Castings are more accurate and smoother—require considerably less finishing.

In addition to Shell Molding Resin 9616, Catalin produces a wide range of core binding liquid resins and powders for the production of ferrous and non-ferrous metal castings.

Catalin representatives, familiar with the requirements of the foundry industry, are available for consultation. Samples on request! Write...



CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE, NEW YORK 16, N. Y.

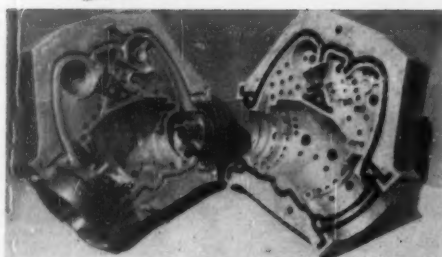
BRANCH OFFICES: CHICAGO, ILL., 221 No. La Salle Street
GREENSBORO, N.C., 630 Southeastern Bldg.



PLANTS at FORDS, N. J.
CALUMET CITY, ILL.
THOMASVILLE, N.C.

STOP BLOW-BY with *Dike-O-Seal*[®]

PATENTS APPLIED FOR

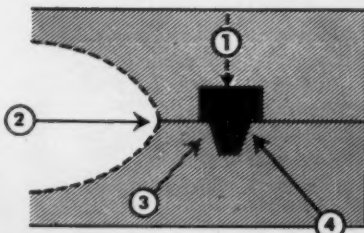


"Dike-O-Seal is the biggest improvement to core blowing since the inception of the core blowing machine"

General Foreman of large automotive pattern shop.

WHAT DIKE-O-SEAL DOES

Because Dike-O-Seal (1) is molded in its own container, it fits perfectly, bonded to every contour, cavity perimeter, loose piece and insert, giving metal-to-metal contact regardless of its complexities. Since it is flexible and because of its unique design, the higher the blow-in pressure (2) the more positive the seal. Pressure acting against the interior of the dike (3) creates static back pressure on the reverse side of the dike (4) positively preventing the escape of erosion-causing sand and air.



Dike-O-Seal can increase your production and lower your costs! This positive seal against parting line blow-by greatly reduces box maintenance and eliminates the necessity for steel or brass facings. Users report that Dike-O-Seal stabilizes core blower performance, permitting more consistent box venting practice which results in better core density control. The elimination of mudding, patching, rattling and finning saves labor costs and consistently produces better cores. The elimination of erosion due to blow-by, the reduction of "down" time, and the extended core box life increases production and profits. See how Dike-O-Seal can help you.

Send for Bulletin #56 and report on stopping BLOW-BY

Dike-O-Pad

FIRST AID FOR CORE BOXES

Dike-O-Pad, the revolutionary new pressure sensitive abrasion resistant pad, has been designed specifically to prevent erosion under blow-tubes. Original application and replacement is so simple there is no need to remove the core-box from production and yet the pads will withstand many thousand blows. They are now saving money for foundries everywhere. Write for price list and samples.

Dike-O-Seal[®] INCORPORATED

Main Office and Plant

Phone PR 8-2878 • 1209 W. 59th ST., CHICAGO 36, ILL.

CIRCLE NO. 176, PAGE 7-8

for the asking

Shell molds in 37 to 60 seconds is the production story of the new Hutchinson machine. Three models, featuring unique method of hinging investment box to pattern carrying frame are described in brochure. *Hutchinson Shell Mold Co.*

CIRCLE NO. 62, PAGE 7-8

Tractor shovel with 4-wheel drive and brakes has a payload capacity of 1-1/3 cu yd. Model HU has carrying capacity of 4000 lb at 4 mph. Model HH has payload capacity of 1-3/4 cu yd with carrying capacity of 5500 lb at 4 mph. *Frank G. Hough Co.*

CIRCLE NO. 63, PAGE 7-8

Direct-reading conductivity meters are covered in reprint bulletin MT-4. It deals with a case history of sorting 10,000 red brass castings at the rate of 500 per hr. *Magnaflux Corporation.*

CIRCLE NO. 64, PAGE 7-8

Foundry equipment book 2423 contains complete installations, tested layouts, sand preparation equipment, mold, core, casting and sand handling equipment. *Link-Belt Company.*

CIRCLE NO. 65, PAGE 7-8

Cupola operating techniques are covered in eight-page bulletin No. FO-11. Illustrated with charts and photos, the bulletin discusses factors of cupola operation that affect combustion and melting conditions. *Whiting Corporation.*

CIRCLE NO. 66, PAGE 7-8

Fractional horsepower motor bulletin GED-2020B, 16 pages, explains various terms and application and selection data for 50 typical applications for home, farm and shop jobs. *General Electric Co.*

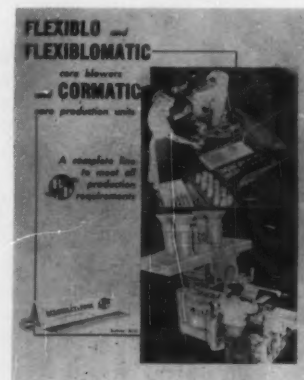
CIRCLE NO. 67, PAGE 7-8

Foundry cleaning applications in form of case histories are reported in two-page publication. Pictures show in-

stallations and work in progress. *Wheelabrator Corp.*

CIRCLE NO. 68, PAGE 7-8

Core blowing machinery ranging from 4 1/2 to 300 lb models is covered in bulletin 5010 which includes dia-



grams, engineering data, construction features and specifications. *Beardsley & Piper Div., Pettibone Mulliken Corp.*

CIRCLE NO. 69, PAGE 7-8

Sands, moisture, binders and how they affect foundry cores are covered in a 12-page brochure complete with charts and illustrations. This is a condensation of several research projects. *Archer-Daniels-Midland Co.*

CIRCLE NO. 70, PAGE 7-8

Muller equipment for medium sand requirements is covered in Bulletin 520, four pages with pictures, drawings and specifications. *National Engineering Co.*

CIRCLE NO. 71, PAGE 7-8

Industrial radiography catalog, 16 pages, covers materials and accessories, and includes illustrations, charts, packing data, and film characteristics. *X-Ray Div., Eastman Kodak Co.*

CIRCLE NO. 72, PAGE 7-8

Laboratory equipment catalog No. 956 in 64 pages incorporates a current price list and many instruments

which have been added since general catalog was published. *Schaar & Co.*

CIRCLE NO. 73, PAGE 7-8

Automatic barrel machines which perform a complete metal finishing job are covered in "Slants on Metal Finishing." Advantages of machine and some of users are listed. *Fred-eric B. Stevens, Inc.*

CIRCLE NO. 74, PAGE 7-8

Thermocouples, featuring enclosed tips, are shown in eight-page catalog. It is well illustrated and includes products in use, parts and price list and descriptive material. *L. H. Marshall Co.*

CIRCLE NO. 75, PAGE 7-8

Continuous seal for use on core boxes is discussed in four-pages with drawings, pictures of applications and descriptive material. *Dike-O-Seal, Inc.*

CIRCLE NO. 76, PAGE 7-8

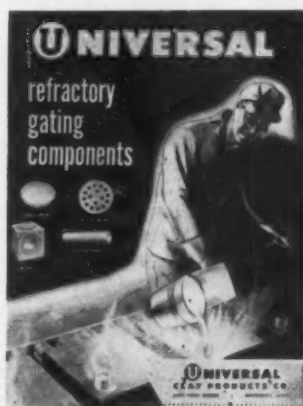
Micrometer reading explained is 12 pages, complete with illustrations, useful rules and decimal equivalents. *The Lufkin Rule Co.*

CIRCLE NO. 77, PAGE 7-8

Blast cleaning and dust control case histories are covered in four-page news brochure. Pictures show equipment in operation. *Pangborn Corporation.*

CIRCLE NO. 78, PAGE 7-8

Standard strainer cores, splash cores, elbows and tubes are the subject of four-page catalog which includes sizes and packaging and chart showing rates of metal delivery through



various cores. *Universal Clay Products Co.*

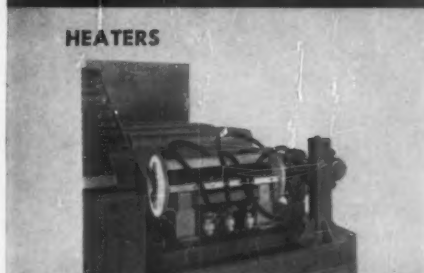
CIRCLE NO. 79, PAGE 7-8

Microscopes for research and industry are described in bulletin M-56, six pages. Models included are tool-

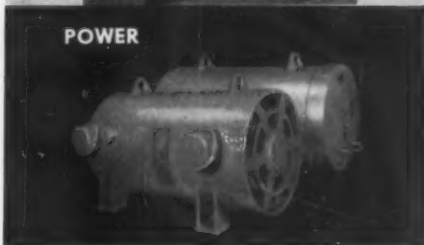
AJAX...for complete induction heating-melting systems



FURNACE



HEATERS



POWER



CONTROLS

Behind every induction furnace there must also be a source of power and a means of controlling that power. While the characteristics of any one of these three elements limits the selection of the other two, there are no hard and fast rules to follow when designing a complete system. Only experienced specialists can effect the perfect match which alone assures you all the advantages induction methods can provide.

You can get some idea of the breadth of choice which exists when planning a system from the general descriptions below. For further details, write Ajax Electrothermic Corporation, Trenton 5, New Jersey.

FURNACE

Tilting Type: Usually chosen for ferrous metals and larger charges of non-ferrous metals. Close coupling between coil and charge makes for high efficiency. Double trunnion keeps spout close to mold.

Lift-Coil Type: For non-ferrous metals in charges to 300 lbs. Inductor coil lowered over charged crucible; raised after charge melts; lowered over second crucible. Highly flexible.

Vacuum and Pressure Type: Wherever exceptionally high purity is required. Custom designed for charges from a few pounds to over 1000 lbs. (steel).

Special Types: AJAX has often drawn on its long experience to design and construct numerous furnaces and crucibles of special sizes and shapes and materials.

HEATERS

General Purpose: Inductors can be designed for any induction heating job. Inexpensive heaters can easily be interchanged for various load sizes and shapes. Special inductors are available to focus heat for forging, brazing, hardening, soldering, etc.

Carbides: These special furnaces for making and hot-working carbides are usually equipped with graphite crucibles or sleeves, able to withstand very high temperatures. Units are available for hot-pressing carbides in vertical or horizontal presses.

POWER

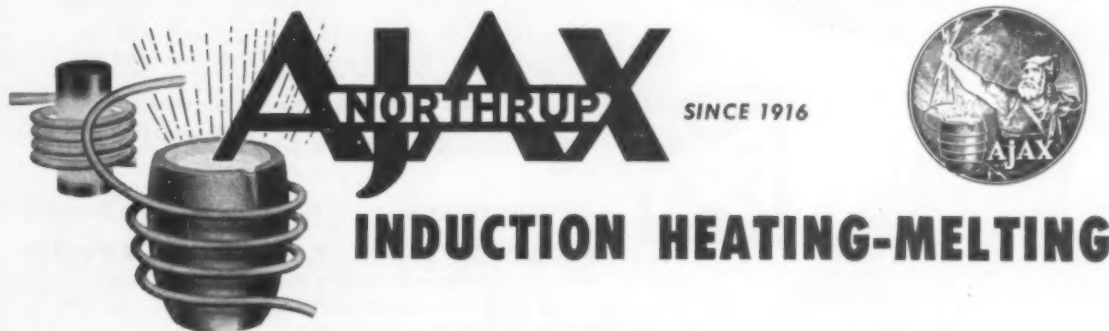
Motor Generators: Used for most large production heating and melting jobs. Available at frequencies from 1 to 10 kc, with output from 30 to 1250 kw and up.

High Frequency Converters: Spark gap converters used in laboratories and for small production jobs. Self-tuning. Frequency range from 12 to 60 kc, at power ratings of 6, 20, and 40 kw.

CONTROLS

All controls for an AJAX installation are grouped in one convenient location. Complete instrumentation permits even a relatively unskilled operator to keep the furnace at top efficiency. The panel shown controls a motor generator set. Converter controls are generally more simple, and are mounted on the converter cabinet.

Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.



CIRCLE NO. 157, PAGE 7-8

Three Steps to Better Castings and Increased Profits

specify

1.

Settling certain points with your customer at the outset insures your profit and his satisfaction upon delivery of the completed order. First determine the service requirements of the casting and characteristics desired. Establish a standard which satisfies the needs at a reasonable cost. Find out if the design is satisfactory functionally, structurally and foundry-wise.

design

2.

Good design insures trouble-free foundry practice, profitable operation and customer satisfaction. Castings with even stress flow are more serviceable and easier to pour. Experimental stress analysis with M Stresscoat brittle lacquer enables your engineers to make design changes without guesswork or wasted effort. Design for service, easy casting, and high profits.

inspect

3.

M Magnaglo (M Zyglo for non-ferrous) is recommended as a "finger on the pulse" means of determining the causes of cracking in the foundry. Simple tests immediately after shakeout or cleaning can locate cracking when it first occurs and enable you to take corrective steps no matter what the cause. With sampling inspection you can actually control the quality of the entire run as it is being poured. You do not waste time and profits handling, heat treating, finishing, etc., intermittent lots of cracked castings. It all adds up to better products for the customers and higher profits for the foundry!

Write for details on how Magnaflux nondestructive testing methods can be employed to increase the yield of usable castings and foundry profits. No obligation, of course!



HALLMARK OF QUALITY IN NONDESTRUCTIVE TESTING

MAGNAFLUX CORPORATION

7352 W. Lawrence Avenue • Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15
Detroit 11 • Dallas 19 • Los Angeles 58

CIRCLE NO. 152, PAGE 7-8

maker and metallurgical, inverted research, camera microscope, wide field binocular stereo, binocular inverted metallurgical and a camera attachment for 35 mm film. *Unitron Instrument Div., United Scientific Co.*

CIRCLE NO. 80, PAGE 7-8

"Casting Finish-Tolerance-Precision" a 12-page paper presented at the 60th Annual Castings Congress & Show of the American Foundrymen's Society, discusses the role of sand in controlling casting finish. *American Colloid Co.*

CIRCLE NO. 81, PAGE 7-8

Direct reading spectrometer analysis is contained in a four-page brochure which includes a description of equipment, developmental possibilities and case histories. *Applied Research Laboratories.*

CIRCLE NO. 82, PAGE 7-8

Epoxy resins and coatings, electrical insulating materials, adhesives and tooling materials are subject of a 12-page, colored catalog. Included are specific applications and case histories. *Houghton Laboratories, Inc.*

CIRCLE NO. 83, PAGE 7-8

"When Disaster Strikes", bulletin GEA-6484, 12 pages, tells how service shops can help plant recovery. Describes procedures for recovery of vital electrical equipment and lists a 5-step protective maintenance program. *General Electric Co.*

CIRCLE NO. 84, PAGE 7-8

Electronic, nondestructive testing instruments, FM-100 series, are discussed in four pages listing range and calibration, method of operation, power requirements and theory. *Magnaflux Corporation.*

CIRCLE NO. 85, PAGE 7-8

Instrumentation bulletin G-2 in 20 pages covers product, technological and application literature. In addition it contains a complete alphabetical index of subjects and companies covered by *Instrumentation* magazine articles over the past 10 years. *Industrial Div. Minneapolis-Honeywell Regulator Co.*

CIRCLE NO. 86, PAGE 7-8

Beryllium casting ingots and master alloys are explained in bulletin No. 3, four pages. Included are tables of typical properties. *The Brush Beryllium Co.*

CIRCLE NO. 87, PAGE 7-8

Electric furnace case histories in two plants are covered in eight-page brochure which contains graphs, pic-

tures and drawings to illustrate the strong points of electric furnaces. *National Carbon Co. Div. Union Carbide & Carbon Corp.*

CIRCLE NO. 88, PAGE 7-8

Air powered presses including bench, arbor and platen type are outlined in four-page catalog. Information includes specifications, pictures and applications. *Van Products Company.*

CIRCLE NO. 89, PAGE 7-8

Shaw process which is being licensed in this country is explained in eight-page brochure complete with pictures showing sequence of operations and range of items which have been cast with process. *Shaw Process Development Corp.*

CIRCLE NO. 90, PAGE 7-8

Wet blast equipment catalog, 56 pages, covers line of manual, semi-automatic and automatic components including illustrated case histories. *The Cro-Plate Co., Inc.*

CIRCLE NO. 91, PAGE 7-8

Inoculation's metallurgical aspects for cast iron are covered in a 16-page illustrated booklet. The alloy is designed to reduce chill depth and improve machinability, tensile strength and transverse properties. *Electro Metallurgical Co., Div., Union Carbide & Carbon Corp.*

CIRCLE NO. 92, PAGE 7-8

Heavy duty vibrators using the principal of the reciprocating piston are covered in eight-page catalog containing illustrations, specifications and pictures. *Vibron Div., Burgess-Sterbentz Corp.*

CIRCLE NO. 93, PAGE 7-8

Conveyor pulley catalog contains 12 pages with detailed specifications on engineering drawings, illustrations and descriptive matter and prices. *R & J Dick Co., Inc.*

CIRCLE NO. 94, PAGE 7-8

Industrial cleaning compounds and solvents, the complete line, is covered in an eight-page bulletin. Contains photographs and product applications. *Brulin & Co., Inc.*

CIRCLE NO. 95, PAGE 7-8

Cold-setting flexible mold compound is subject of Bulletin No. 12 which gives physical data, preparing and removing the model, casting into the mold. *Smooth-On Mfg. Co.*

CIRCLE NO. 96, PAGE 7-8

Non-rotating air cylinders, 21 models, are discussed in 12-page illustrated catalog. It contains complete

Better castings...with controlled microstructure
and improved mechanical properties

VANCORAM

V-5 foundry alloy



V-5 Foundry Alloy — a chromium alloy balanced with manganese and silicon — makes improvement of gray cast iron easy and economical.

Small additions improve mechanical properties, density and uniformity. At the same time, chill is reduced without formation of open structure in heavier sections. The greater uniformity, with its elimination of chilled corners and edges, results in improved machinability and consequent lower costs.

Get the complete story of how Vancoram V-5 Foundry Alloy can mean better castings in your foundry. Send today for your free copy of this interesting, informative brochure. If you have problems relating to ferro alloys, our Engineering Sales and Technical Representatives will be glad to help you. Just call your nearest Vanadium District Office.

Vancoram V-5 Foundry Alloy and other alloys for the iron foundry are also available through the following distributors:

STEEL SALES CORPORATION — Chicago, Detroit, Milwaukee, Indianapolis, Grand Rapids, Minneapolis, St. Louis, Kansas City, Mo.
J. M. TULL METAL & SUPPLY COMPANY — Atlanta, Ga., Jacksonville, Tampa, Miami, Fla.

WHITEHEAD METAL PRODUCTS COMPANY, INC. — New York City, Buffalo, Syracuse, Albany, Schenectady, Rochester, New Haven, Philadelphia, Baltimore, Harrison, N. J., Cambridge, Mass., Richmond, Va.

WILLIAMS & COMPANY, INC. — Pittsburgh, Cleveland, Cincinnati, Columbus, Toledo.



Vanadium Corporation of America
420 Lexington Avenue, New York 17, N. Y.

I'd like to know more about how castings are improved through the addition of V-5 Foundry Alloy. Please send your bulletin to:

Name..... Position.....
Company.....
Address.....
City..... Zone..... State.....



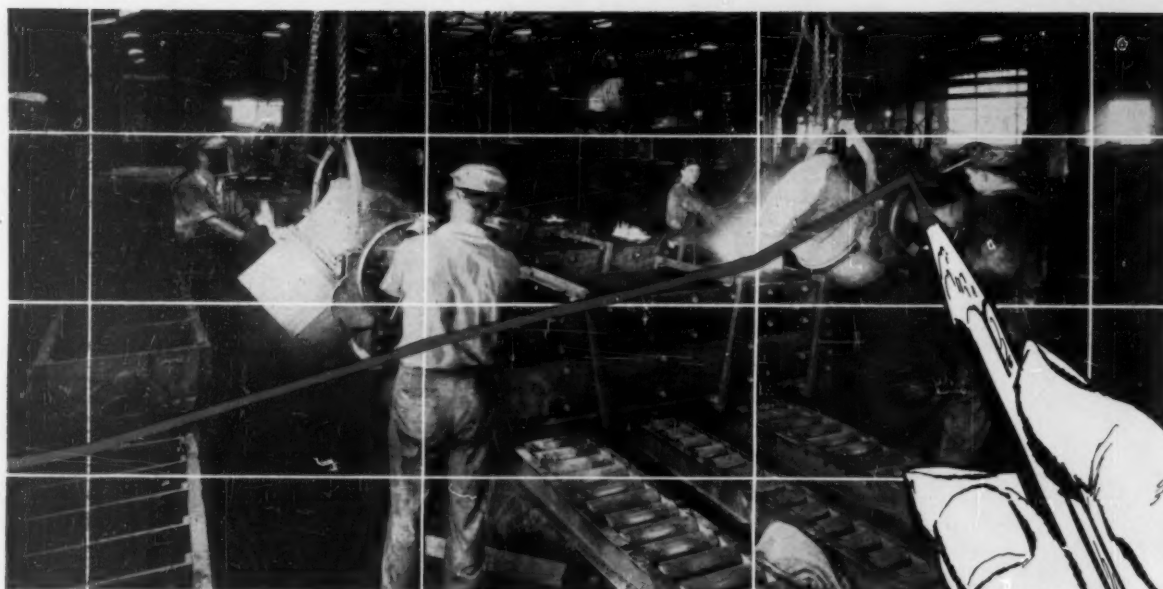
VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y. • Pittsburgh • Chicago • Detroit • Cleveland

Producers of alloys, metals and chemicals



CIRCLE NO. 170, PAGE 7-8



HOW DOES YOUR FOUNDRY GROW?

Through an increasing awareness of cast metals potential; through streamlined production methods; through continued research and new development.

Yes, these are the necessary growth factors. But they all stem from one source . . . sound, technical leaders and pre-indoctrinated customers.

The investment of the foundry industry in the student of today and tomorrow largely determines its potential. We cannot grow as an industry — or as an individual foundry — without soundly indoctrinated foundry technicians.

Through the efforts of the Foundry Educational Foundation, 31% of all engineering students at F.E.F. affiliated universities now participate in cast metals study. This means a large annual pool of capable producers for the foundry industry.

What are you contributing to that pool today, for your greater benefit tomorrow?

● Write today for our detailed booklet, "Let's Look Ahead".

Foundry Educational Foundation

1138 TERMINAL TOWER BUILDING • CLEVELAND 13, OHIO



Space contributed by modern castings as another service to the metal castings industry

CIRCLE NO. 144, PAGE 7-8

engineering data on company's cylinders, valves and accessories. S-P Mfg. Corp.

CIRCLE NO. 97, PAGE 7-8

Concrete floor patching or overlaying with Stonpach is discussed in six-page folder. It may be applied as thin as one-half in. with compressive strength said to be greater than concrete. Stonhard Company.

CIRCLE NO. 98, PAGE 7-8

Basic Steel manufacturing is discussed in a 12-page illustrated booklet covering both basic and acid furnace operations and estimates probable conversion costs. Basic Incorporated.

CIRCLE NO. 99, PAGE 7-8

Self-propelled "Railporter" which runs on a single rail is covered in bulletin 56-47, eight-pages. Pictures show how unit is stabilized by means of four outboard rollers riding on side flanges of rail. Construction Machinery Div., Chain Belt Co.

CIRCLE NO. 100, PAGE 7-8

Induction motor bulletin 05B8123A covers two-pole squirrel-cage induction motors, 900 hp and larger. Construction details include description of its spiral ventilation system. Allis-Chalmers Mfg. Co.

CIRCLE NO. 101, PAGE 7-8

Gun patching of cupolas with monolithic lining with refractory gun are covered in four-page bulletin. Eastern Clay Products Dept., International Minerals & Chemical Corp.

CIRCLE NO. 102, PAGE 7-8

Direct-current motors, ½ through 200 hp and motor-generator sets through 200-kw output are described in bulletin 53B8424, six pages. Included is a cutaway highlighting the features. Allis-Chalmers Manufacturing Company.

CIRCLE NO. 103, PAGE 7-8

Lift stackers, cranes and elevators are discussed in Catalog 56, eight pages. Included are photos of units in use, specifications and prices. Red Tiger Products, Inc.

CIRCLE NO. 104, PAGE 7-8

Fluorescent lighting for industrial installations is subject of Bulletin B, 36 pages describing 394 units. Systems are discussed for various applications. Benjamin Electric Mfg. Co.

CIRCLE NO. 105, PAGE 7-8

Overhead conveyor known as "Chainveyor" is covered in four-page catalog which includes pictures of instal-

lations. Conveyor is said to run in any direction including upside down. *Chainveyor Corp.*

CIRCLE NO. 106, PAGE 7-8

Gas oven control "Oventrol", a combination gas cock and oven thermostat is described in bulletin RT-781 which contains a cutaway view and diagrams. *Robertshaw-Fulton Controls Co.*

CIRCLE NO. 107, PAGE 7-8

Conveyor which utilizes flat side skirts as links is covered in bulletin PL9, four-pages, which uses photographs and diagrams to show features and installation. *Hapman Conveyors, Inc., Div., Hapman-Dutton Company.*

CIRCLE NO. 108, PAGE 7-8

Blast nozzle with tungsten-carbide liners are covered in bulletin G-1 1-55, two pages. Illustration shows new design of nozzle. *Vacu-Blast Co., Inc.*

CIRCLE NO. 109, PAGE 7-8

Rotary finisher and buffer for abrasive finishing operations is covered in two page catalog sheet listing specifications and picture of unit. *Mathewson Machine Works, Inc.*

CIRCLE NO. 110, PAGE 7-8

Welding equipment, both semi-automatic and automatic for use in CO₂ and inert-gas metal-arc welding is discussed in six pages of pictures, diagrams and cutaways. *National Cylinder Gas Company.*

CIRCLE NO. 111, PAGE 7-8

Conveyor equipment including patented products and custom built equipment are covered in Cat. 500, 48 pages with photos, drawings, layouts, charts and engineering data. *Prab Conveyors, Inc.*

CIRCLE NO. 112, PAGE 7-8

Refractory, air setting cement, its mixing and application are explained in bulletin CP7.4, two-pages. This highly refractory cement is designed for high temperature applications with minimum of slag. *Norton Company.*

CIRCLE NO. 113, PAGE 7-8

Chaplet catalog No. 56 lists double-headed models up to 1½ in. stem diameters. The 12 page publication is a reference for radiator, motor, boiler and single-head forged and fitted head chaplets. *Cleveland Chaplet & Mfg. Co.*

CIRCLE NO. 114, PAGE 7-8



These two 300 pound TOCCO melting furnaces are powered by a 200 KW, 3000 cycle TOCCO motor generator set.

TOCCO* Induction Melting "Delivers"— In Two Days Instead of Two Months!

Casting backlogs at Commercial Shearing and Stamping Co. in Youngstown, Ohio used to lag from 8 to 10 weeks behind production schedules. By installing four 300 pound TOCCO melting furnaces this firm upped daily melting capacity to 16,000 pounds. Now orders can be shipped in 48 to 72 hours.

In a foundry occupying less than 5000 square feet of space, production of castings jumped between 40% and 50%; tensile strength of alloy castings was boosted from 35,000 to 50,000 p.s.i. Substantial

savings in the cost of castings have resulted. Moreover, with precision casting and molding on a push-button basis, many former drilling and roughing operations were completely eliminated.

Many firms have discovered that TOCCO Induction Melting insures maximum quality control, increased volume and lower operating costs—foundry premiums directly linked to TOCCO's rapid melting, simplicity of operation, low alloy loss, constant burn off and pinpoint quality control.

THE OHIO CRANKSHAFT COMPANY



TOCCO

NEW FREE
BULLETIN

Mail Coupon Today

THE OHIO CRANKSHAFT CO.
Dept. N-12, Cleveland 5, Ohio

Please send copy of "The Case for TOCCO Induction Melting."

Name _____

Position _____

Company _____

Address _____

City _____ Zone _____ State _____

CIRCLE NO. 141, PAGE 7-8

USING TOO MUCH COKE?

Why not talk this over with one of our metallurgists with a view to taking advantage of the superior quality of Semet-Solvay Foundry Coke in reducing your melting costs.

SEMET-SOLVAY DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street



New York 6, N. Y.

Buffalo • Cincinnati

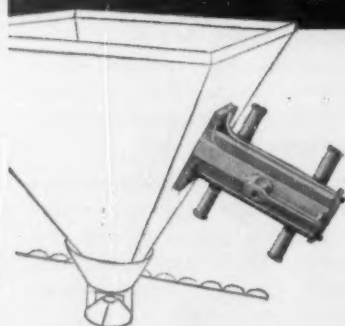
Cleveland • Detroit

In Canada: SEMET-SOLVAY COMPANY, LTD., Toronto
Western Distributor: WILSON & GEO. MEYER & CO., San Francisco

For Better Melting

CIRCLE NO. 161, PAGE 7-8

VIBRON'S ^{new} ALUMINUM VIBRATOR



REDUCES WEIGHT 65%

Yet powerful enough to move bulk materials freely in Chutes—Screens—Bins—Hoppers and Conveyors.

REDUCES NOISE 90%

Vastly improves worker efficiency!

INCREASES PRODUCTION

With powerful Vibron high compression cycle.

INCREASES WORK LIFE

Designed with exclusive micro finish bores for continuous production applications. Saves costly bin maintenance.

Aluminum Vibron Vibrators are accepted components on standard automation machinery in the auto industry.

Write—Wire—Phone for Complete Information NOW! Phone Winton 1-7900

BURGESS STERBENTZ CORPORATION

3790 West 150th Street • Cleveland 11, Ohio

CIRCLE NO. 167, PAGE 7-8

NFA Discusses Management Front

Building a strong, united management front and establishing better communications throughout the plant were the themes of the 58th annual meeting of the National Foundry Association held October 11-12 at the Sheraton-Cadillac Hotel, Detroit.

Paul Arnold, N.F.A. president, United States Pipe & Foundry Co., Chattanooga, Tenn., opened proceedings with the president's report followed by "United Labor Front Requires a Strong, United Front" presented by N.F.A. vice-president, Arthur G. Hall, Nordberg Manufacturing Co., Milwaukee.

Hall stated that with the merger of organized labor and the expansion of its research, organizational and political activities, alert foundry management finds it more vital than ever before to have essential facts and knowledge readily available.

"Developing Effective Employee Communications" was discussed by Dr. Paul J. Mundie, Humber, Mundie & McClary, Milwaukee. A consulting psychologist, Dr. Mundie said that proper and effective communications were becoming increasingly important since mistakes may be extremely costly. Executive communication is the heart of the employee problem and it is the role of management to develop a company philosophy and goal and to inform its members of its aims, he said.

Suggested steps in improving communications included better communication between family members, an increased number of executive meetings to discuss not only business problems but also to deal with personal improvement, the maintaining of a

written evaluation of every person interviewed with notes for future reference and the publishing of house organ publications on a regular basis. The latter, he said, serves not only as an effective method of communication but also gives members a feeling of belonging to the organization.

Dr. Mundie encouraged the formation of discussion groups for all management employees and suggested that such programs should be planned by outside groups to present a well balanced schedule.

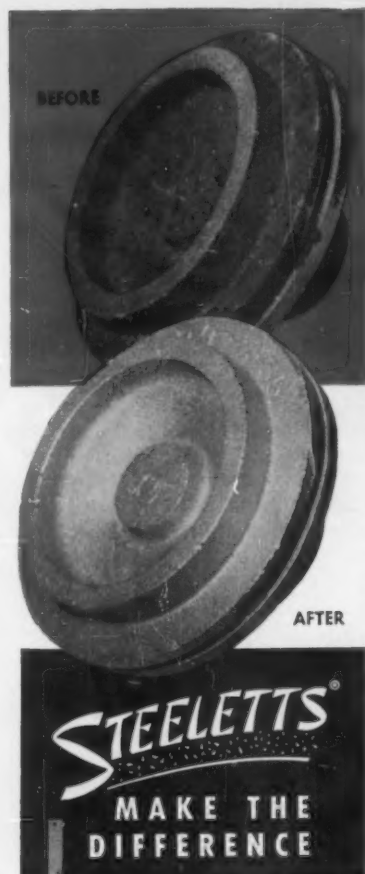
Dr. John K. Langum, economist, Business Economics, Inc., Chicago, discussed economic conditions and business prospects at the luncheon. He predicted a strong business picture at least until the second quarter of 1957. This, he said, is based on rising plant equipment expenditures, increasing inventories, government spending and likely increases in auto and retail sales.

Over a longer period Dr. Langum foresees the possibility of a distinct downturn in the business picture but that with various economic and governmental controls sees no possibility of conditions such as existed in the early 1930s. The future, he stated, would be one of increasing production with an increasing standard of living.

In the afternoon a panel discussion was held on the steward-foreman relationship. Members were Ray F. Heiden, Galva Foundry Co., Galva, Ill., moderator; N. T. Booth, Deemer Steel Casting Co., New Castle, Del.; R. L. Jackson, Jackson Industries, Inc., Birmingham, Ala.;



NFA Administrative Council. Seated clockwise, C. T. Sheehan, Arthur G. Hall, Martin J. Ewald, Curtis B. Hasty, Jr., Harold W. Warner, Ray F. Heiden, Robert M. Walton, C. A. Carolin, Warren A. Brown, R.C.S. Potter, A. V. Martens, Eugene F. Schlickman, William J. Bulman, Andrew E. Jencks, W. W. C. Ball, A. Lysle Dyer, R. R. Washburn, W. G. Greenlee, J. C. Meyers, Jr., George Grosser, R. Redmond and Paul R. Arnold.



**STEELETTS IMPROVE
APPEARANCE, CUT COSTS
IN NON-FERROUS FINISH-
ING FOR THESE REASONS:**

UNIFORM ETCHING

Steeletts resistance to breakdown provides a more uniform etch.

LONGER LIFE

Steeletts are a high-carbon electric furnace steel grit, especially-heat treated to remain full size far longer.

REDUCED ABRASIVE CONSUMPTION

Due to their breakdown resistance, Steeletts remain effective through many more blast cycles.

FAST CLEANING

Because of Steeletts hardness, they give faster cleaning and permit quick, easy etching of all surfaces.

LESS EQUIPMENT MAINTENANCE

Steeletts eliminate sharp fracture edges, reduce wear and maintenance of blades and liners.

FOR COMPLETE INFORMATION ON STEELETTS, WRITE TODAY FOR BULLETIN No. 901-D.

**WHEELABRATOR
CORPORATION**

630 South Byrkit St., Mishawaka, Ind.
CIRCLE NO. 150, PAGE 7-8

E. S. Mathiesen, Cutler-Hammer, Inc., Milwaukee; and Harry J. Kelley, American Seating Co., Grand Rapids, Mich.

The panel agreed that foremen should have a thorough understanding of the company policy, labor contract and the steward relationship. The foreman should be trained to be a good listener, to recognize likely grievances and to work harmoniously with the union.

The installation of officers completed the program for the first day. All officers were re-elected, they are Paul L. Arnold, *president*, Arthur G. Hall, *vice-president*, Frank J. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill., *treasurer* and C. T. Sheehan, *executive secretary*.

Friday's activities opened with a panel discussion on smoother bargaining with both management and labor representatives. Members were: Albert J. Graf, The Cottrell Co., Westerville, R. I., moderator; W. M. Bucher, and Swayne, Robinson & Co., Richmond, Ind.; W. G. Raven, Continental Motors Corp., Detroit; Joseph McCusker, United Auto Workers; and Frank Voit, International Molders and Foundry Workers' Union.

All members agreed that mutual respect is needed in any union-management relationship and that personalities had no place in an orderly discussion.

Mr. McCusker stated that unions must be regarded as a part of the nation's economy and that the functions of the unions include not only planning for his immediate needs but also for the future. Mr. Voit said that most labor contracts could be greatly improved by simplification of contracts and the elimination of qualifying conditions.

On the management side it was stated that unions sometimes must lower their standards to aid management and that unions should not try to impose on individual firms conditions granted in other locations or other industries.

Following luncheon, Dr. George D. Heaton, Myers Park Baptist Church, Charlotte, N. C., talked on "The Common Goals of Employers and Employees." He said that the difference between failure and success of a business is often due to the company's relationship with employees. Businesses which are "person-centered" will outproduce those that are not, he emphasized. To achieve this he recommended that employees be given self-recognition, be allowed to participate in the solution of their problems and be allowed to have his problems understood.

**23% ABRASIVE
COST SAVINGS
ON STEEL CASTINGS**

Malleable
abrasive
cost

Wheelabrator
Steel Shot
cost

**WHEELABRATOR®
STEEL SHOT**

**cuts abrasive costs
up to 23%
for Crucible Steel Castings Co.**

Wheelabrator Steel Shot proved most economical cleaning steel castings at Crucible Steel Castings Co.! Tests made in a 3-wheel Wheelabrator Monorail Cabinet showed these results: In 322 hours, the 3 wheels consumed over 19,000 lbs. of malleable abrasive, for an abrasive cost averaging \$1.578 per wheel hour for each wheel. In 202 hours, the machine used approximately 6,800 lbs. of Wheelabrator Steel Shot for an average abrasive cost of \$1.215 per hour for each wheel. This means savings of \$.363 per hour for each wheel. The Milwaukee steel foundry operates 10 wheels a total of 100 hours each day, so daily abrasive cost savings add up to approximately \$36.30 — or about \$8,000 annually. You, too, can save with Wheelabrator Steel Shot, the low-cost answer to cleaning problems.

For additional information on Wheelabrator Steel Shot, send today for Bulletin 89-C.

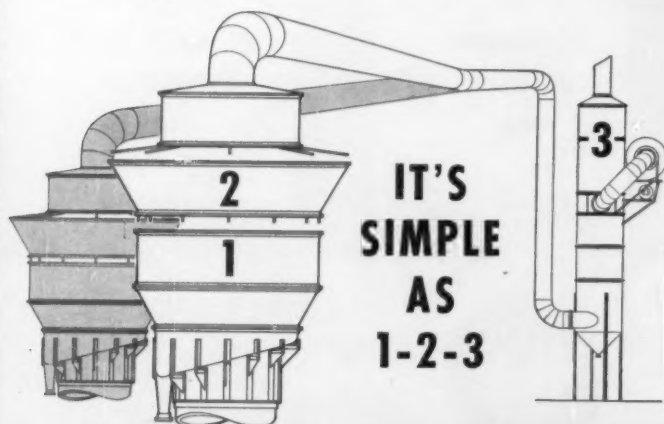


**WHEELABRATOR
CORPORATION**

630 S. Byrkit Street, Mishawaka, Indiana
CIRCLE NO. 149, PAGE 7-8

SCHNEIBLE

new
**A SCHNEIBLE APPROACH MEETS
YOUR CUPOLA EMISSION
REQUIREMENTS NOW AND IN
THE FUTURE!**



1. The highly successful "SW" Cupola Collector is guaranteed to remove down to .7 lbs. / 1,000 lbs. of gases.*
2. The recently designed adaptor can be added to an "SW" Collector, which will then be guaranteed to remove down to .5 lbs. / 1,000 lbs. of gases.*
3. Step No. 3 can be connected either to step No. 1 or step No. 2 by means of a takeoff connection to a Multi-Wash Collector. We would then guarantee to remove down to .3 lbs. / 1,000 lbs. of gases.*

*The guarantees listed above will be based upon individual installations and conventional cupola operations outlined in the AFS Cupola Handbook and in our brochure.

IMPORTANT: With the NEW SCHNEIBLE development to control cupola emissions, your original INVESTMENT is always utilized. As the codes you operate under become more stringent, you need only to go to the next step in the SCHNEIBLE PLAN.

SCHNEIBLE

WRITE TODAY FOR OUR NEW BROCHURE
"CUPOLA EMISSION CONTROL—
A NEW APPROACH"

CLAUDE B. SCHNEIBLE COMPANY

P. O. Box 81, North End Station—Detroit 2, Michigan

Name _____
Title _____
Company _____
Address _____
City _____ Zone _____ State _____

SERVING FOUNDRYMEN THE WORLD OVER



dietrich's corner

by h. f. dietrich

Let's face it! The journeyman has gone the way of the Indian scout, the court jester, and the town crier. The fact that he has joined the others in the limbo of lost occupations is not in itself cause for alarm, but the reason for his passing will give us something to think about. We have lost our pride in individual workmanship!

Before you take that deep breath with which you will tell me that we make the best, the biggest, and that we make them the fastest, let me give you an example of what I mean.

A number of years ago—more than I care to remember—I unrolled my bag of tools in the crane bay of the old National Brake Steel Foundry. On the floor beside me I met Walter, as meticulous a sand-rat as ever handled a lifter. If some pattern bull caused a cope he had rammed to rat off, he would give the hanging cope a patch that was a work of art. Michelangelo would have admired the way Walter handled a trowel while his neck was bent at right angles to his back. When Walter wedged a chuck to a bar, the chuck was there to stay. He would give it a final tap with the hammer to test it for sound. Walter and I worked together for thirty-six hours closing a pit job. At the end of that time he didn't miss a wedge. If you asked him, he would tell you the pattern number of the job he was working on, whom it was for, the weight of the casting, and its use. Beside the foundry mark he would imprint his initials with one of the three blocks he carried. That was to tell the

world that Walter made the mold.

Fifteen years later, I met Walter again. He was working in the main bay of another steel foundry. When the pattern chaser picked up Walter's pattern, he found an eight inch coreprint missing. Walter had left it in the cope, sprayed it with mold wash, and sent it to the oven to bake. A week later, he clamped one side of a floor mold, cleaned up his floor, and went home. He had discarded his initial blocks.

You say that is just one molder who hit the skids? Don't believe it! It is a trend of the times in which we live. We have lost pride in our workmanship. The condition is not unique to the foundry. It is general attitude we have developed through the years. There are hundreds of Walters in all trades.

Other indexes of progress are literature and drama. In the days of Twain and Dumas, flowery words and phrases were combined to produce humor, pathos, and drama. It required the skill of an artist to die convincingly while he waved his arms, rolled his eyes, and made long moral speeches, or sang an aria as he bit the dust.

We strip our literature of sunsets;—who has time to watch them?—We shorten our sentences by ellipses; strip the plot to the bare bone, and speed-read the first and last lines of a paragraph. We depend upon condensed versions of long books. Our education is given us by literary hypodermic. The art of reading and writing has fallen into disuse. Craftsmanship has been lost to supersonic speed. WE DO NOT HAVE TIME.

H. F. Dietrich . .

. . is the gen-u-wine article, a real foundryman. He spent five years of his youth working his way from Milwaukee to Portland, Ore., as a journeyman molder in steel foundries. When things picked up after the depression, he turned his hand to gray iron molding. After the 8th grade, Dietrich abandoned formal education until he entered college in 1948 at the age of 42. He is now head of the foundry department, Kansas State College.

ASTM Reports Studies of Cast Metals Specs

■ With research and development on metals for castings, expanding at a rapid rate, American Society for Testing Materials technical committees are being provided with plenty of grist for the standards mill. The current ASTM Bulletin summarizes activities of several of these committees which are of particular interest to the castings industry.

Committee A-3 on Cast Iron is considering the feasibility of including in Specifications A 43 the grades of pig iron particularly suited for the production of nodular irons. The design of gray iron test bars and the determination of tensile strength is being reviewed by a task group. Preliminary drafts of a recommended practice for the application of cast irons to low-temperature service are now being revised.

Atmospheric corrosion of malleable iron at various locations is being studied by Committee A-7 on Malleable Iron Castings.

Approximately ten specifications covering nickel and nickel alloys have been undergoing extensive revision by Committee B-2 on Non-Ferrous Metals and Alloys. Included, are two new specifications for Hastelloy alloys in wrought and cast form—expected to be published early in 1957.

GIFS Elects For '57

J. Scott Parrish, Jr., Richmond Fdy. and Mfg. Co., Inc., Richmond, Va., was elected president of the Gray Iron Founders' Society at its 28th Annual Meeting on October 31.

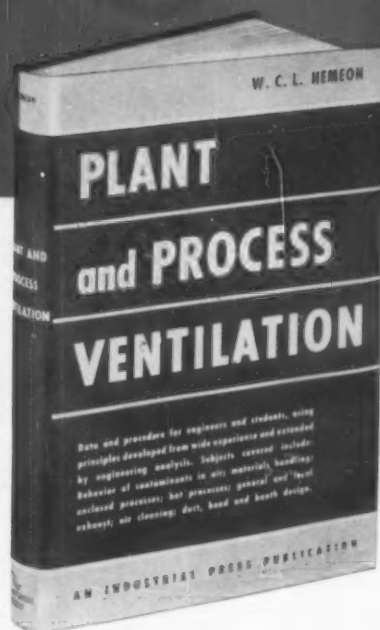
A. M. Nutter, E. L. LeBaron Fdy. Co., Brockton, Mass. was named vice president and A. H. Renfrow, Renfrow Fdy., Los Angeles, and H. J. Trenkamp, Ohio Fdy. Co., Cleveland, were elected secretary and treasurer, respectively. Cecil R. Garland, W. O. Larson Fdy. Co., Grafton, Ohio was named assistant treasurer.

New members of the board of directors also elected at the meeting were H. P. Good, Textile Machine Works, Reading, Pa.; Earl Paltenghi, H. C. Macaulay Fdy. Co., Berkeley, Calif.; A. L. Dyer, Buckeye Fdy. Co., Cincinnati; J. E. Quest, J. F. Quest Fdy. Co., Minneapolis; and W. A. Hepburn, John T. Hepburn, Ltd., Toronto, Canada.

D. H. Workman, executive vice president, and Charles F. Walton, technical director, were re-appointed for another year.

4 BASIC BOOKS

To Help You Solve Plant Ventilation Problems



1 **PLANT AND PROCESS VENTILATION**, by W. C. L. Hemeon, presents for the first time a comprehensive treatment of fundamental principles and their application to practice in the design of ventilating systems for control of industrial air contaminants. Physical laws are translated into clear and logical procedures for calculating required air volumes and velocities for exhaust, ventilation, and material transport. New meaning is given to velocity contours around suction openings. The author's original concepts of dilution ventilation and hot process ventilation are fully presented. The reader is greatly assisted by carefully selected and completely worked out illustrative problems. Theodore Hatch in his review says: "This volume, to an outstanding degree, raises the level of analysis and design from an empirical stage to one based upon sound physical and engineering principles. The book is written for practical design engineers. Use of the design principles . . . will result in better performance . . . fewer system failures, and lowered operating costs." 448 Pages, 172 Illustrations. \$9.00. In Canada or overseas, \$10.00.



2
DESIGN OF INDUSTRIAL EXHAUST SYSTEMS

How to design, build or buy an exhaust system that will conform to the requirements of law as well as to good industrial hygiene practice. Covers mechanical arrangements and basic design data for a wide variety of industrial situations, such as the removal of dust, fumes, vapors, gases and steam. Provides practical data on exhaust ventilation, design of hoods, piping and structural details, selection of dust separators, centrifugal and axial-flow exhaust fans. 252 Pages, 120 Illustrations. \$3.50. In Canada or overseas, \$4.25.



3
EXHAUST HOODS

This book, by J. M. DallaValle, is the only book published that gives comprehensive information on the flow of air around and into the openings, hoods or slots in exhaust ventilating systems. Covers all phases of hood, booth and slot design. Shows how to determine the required air volume and velocity for hoods and other types of openings for the control of all kinds of dusts, fumes and gases. Contains a chapter devoted entirely to sample problems and solutions. 130 Pages, 127 Illustrations. \$3.50. In Canada or overseas, \$4.20.



4
FLOW AND FAN

Gives you the *how* and *why* behind the basic calculations in the design of ventilating systems, and therefore provides the practical information you need to select a fan for a specific duty. If you are in any way concerned with the movement of air through ducts and the selection and control of fans, this will be a first-rate working handbook for you. The author, C. Harold Berry, holds the rank of Professor of Mechanical Engineering at Harvard. 232 Pages, 84 Illustrations. \$4.00. In Canada or overseas, \$4.70.

SEND FOR FREE 1956 CATALOG

Additional books on ventilation, metalworking and related subjects are described and illustrated in the new 1956 Industrial Press Catalogs. To get your free copies, just check the coupon.

THE INDUSTRIAL PRESS, 93 Worth Street, New York 13, N. Y.
Please send me the books I have checked below.

- ☐ Plant and Process Ventilation ☐ Exhaust Hoods
☐ Design of Industrial Exhaust Systems ☐ Flow and Fan
☐ Send Free Copies of the 1956 Industrial Press Book Catalogs

Name

Firm

Street

City Zone State

Home Address

(Please fill in if you want books sent to your home) MC-4/56

CHECK METHOD OF PAYMENT YOU PREFER

☐ Payment in full enclosed. Send book postpaid. (I may return it for full credit if not satisfied.)

☐ Send book under Five-Day Free Inspection Plan. (Postage and handling charges of 15¢ per book will be added.)

☐ Bill me ☐ Bill Company

Note: Overseas orders must be accompanied by full payment in U. S. funds.

At 46 places around the nation each month, members of the American Foundrymen's Society assemble for meetings of local AFS chapters. Although each of these chapter varies in its history, in its size, and in its program, the pictures here illustrate some things that happen on every . . .

Chapter Meeting Night



Executive Committee Session. Before a meeting featuring a talk by J. E. Stock, John Deere Waterloo Tractor Works, **Chicago** Chapter heads talk things over. Left to right, J. T. Moore, director; R. P. Schauss, president; Robert Doelman and John Rassenfoss, directors.



Speaker. C. E. Fausel, from Central Foundry's Danville plant was at **Central Ohio**.



Speaker. Wm. Geisler, from Davenport Machine & Fdy., was on deck for **Quad City**.



After The Show. Plenty of questions for the speaker is a characteristic of chapter meetings. Here, **Texas** Chapter speaker Frank Scaggs, Oklahoma Steel Castings, holds a session with Joe Kartye, Art Guidi, and P. C. Biven, all from Texas Foundries, Inc., Lufkin.

local foundry news



Common interests brought together New York foundrymen and H. Peters, works director of the Birmingham Aluminum Co., Birmingham, England for an informal international meeting. The group met in Syracuse, N. Y. during October. A previous meeting had been held with Syracuse members and J. W. Berry, joint managing director of the English firm. Seated in the front row, left to right are Malcolm Baldridge, Frazer & Jones Co.; George Stanton, Stanton Foundries; William D. Dunn, Oberdorfer Foundries; H. Peters, Birmingham Aluminum Co.; James Jardine, Jardine Bronze Co.; R. J. Denton, R. J. Denton Co. Standing are Thomas Dungey, Wolf & Dungey Co.; Nate Meloon, Meloon Bronze Fdy.; George P. Stanton, Jr., Stanton Foundries, Charles Meister, Jardine Bronze Co., Donald Krueger, Foundry Service Company.



Holding offices for 1956 in the **Toledo** Chapter are these officers and directors: standing, left to right, are the directors: C. E. Eggenschwiler, Bunting Brass & Bronze; Paul Guilford, Central Foundry Div., GMC, Defiance; C. Wandtke, Schill Pattern; Dan Schmidt, Bunting Brass & Bronze; M. E. Boyd, Maumee Pattern Co.; Ted Giszczak, Central Foundry Div. GMC, Defiance; Bill Miller, Unitcast Corp.; Barney Beierla, E. W. Bliss Co.; V. E. Zang, Unitcast Corp.; C. M. Hannaford, Unitcast Corp. Officers, seated: Martin J. Gruhler, vice-chairman; Cloyce W. Taylor, chairman; LeRoy F. Schultz, secretary; Roy C. Ensign, treasurer.



Making the wheels go around in the **Northwestern Pennsylvania** Chapter are: front row, W. C. Peelman, director, Erie Malleable Iron Co.; E. J. Bonesteel, vice-chairman, General Electric Co.; R. L. Johnson, chairman, Bucyrus-Erie Co.; and directors James Markowitz, Cascade Foundry Co.; Paul Green, General Electric; and J. Diemert, Erie Casting Co. Standing are directors F. P. Harter, Corn Products Sales Co.; A. Wightman, Lakes Laboratory; John Considine, Griswold Mfg. Co.; R. W. Griswold, national director, Erie Malleable Iron Co.; O. C. Bueg, Arrow Pattern and Eng. Co.; F. P. Volgstadt, Cleveland Flux Co. Photographer was another chapter director, Walt J. Yahn, American Sterilizer Co.



William Hambley attracted 225 **Northeastern Ohio** Chapter members to his discussion of "Casting Defects." Left to right are, Claude Jeter, program chairman, Ford Motor Co.; Hambley, consultant for Chas. Krause Milling Co.; and A. D. Barczak, chairman, Superior Fdy., Inc.



Management representatives at **St. Louis** Chapter are swapping ideas about supervisor development. Left to right are: L. C. Farquhar, American Steel Foundries; chairman J. O'Meara, Banner Iron Works; guest speaker T. P. Tierney, Monsanto Chemical Co.; C. B. Shanley, Semi-Steel Casting Co.; W. L. Rammerer, Midvale Mining & Mfg. Co.



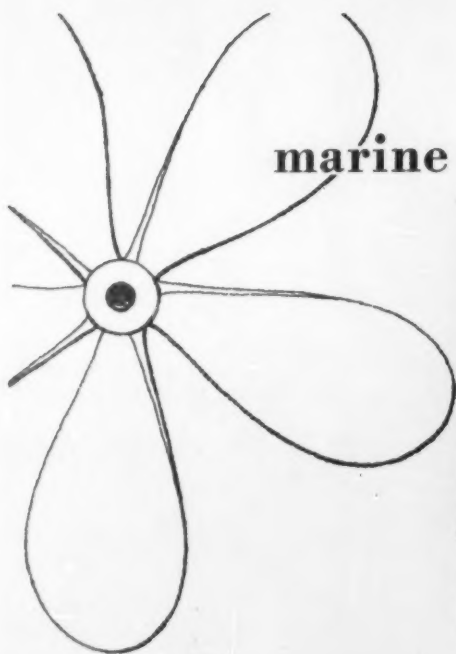
Cupola operations were investigated at **Chesapeake Chapter** by W. W. Levi, Radford Foundry; Harvey Henderson, Lynchburg Fdy. Co.; speaker H. H. Wilder, Vanadium Corp.; and Lewis H. Gross, chapter chairman.



William B. Coleman Night at the **Philadelphia** Chapter featured the presentation of the second annual Wm. B. Coleman Scholarship in memory of the late secretary-treasurer of the group. Presented each year to a Pennsylvania State University student, this year's award went to Joseph Zborney, a Penn State senior. Above are D. E. Best, Bethlehem Steel Co., chairman of the scholarship fund committee; Prof. Dan Clark, Penn State; winner Zborney; and C. W. Mooney, Jr., Olney Foundry, member of committee now soliciting scholarship funds.



Ladies Night found the **Detroit** Chapter entertaining at the Detroit Yacht Club. Enjoying the nautical atmosphere with whole-hearted enthusiasm are Mmes. H. Brauner, W. Yaw, R. W. Mott, and H. Goodhue.



marine engineers specify...

BRONZES

time tested alloys of lasting beauty and outstanding performance

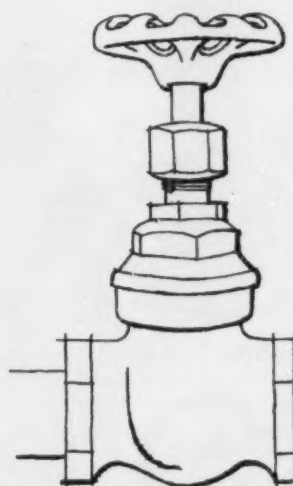
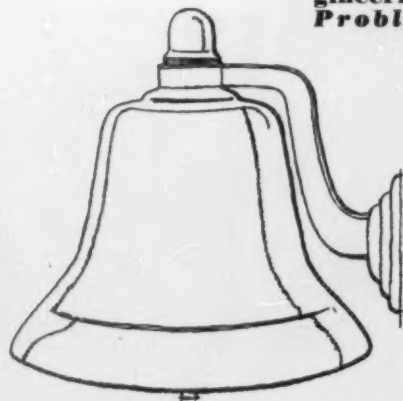
BECAUSE BRONZE RESISTS THE CORROSIVE ACTION OF THE SEA

Whether it be the ornamental and functional bell or the powerful propeller, bronze (copper base) alloys of suitable composition, are available to meet the specific requirements of each application.

Color, machinability, strength, castability and low manufacturing costs are the qualities marine engineers consider when they specify BRONZE ALLOYS.

Lavin's metallurgical staff is always ready to assist the foundryman in finding the solution of any routine or special casting problem. Our chemical and research laboratories are available to you at no cost or obligation.

Next time call upon LAVIN'S engineering service "The Foundryman's Problems Are Our Problems"



R. LAVIN & SONS, INC.

- OFFICES—Boston, Pittsburgh, Cincinnati, Minneapolis, Philadelphia, Cleveland and Detroit
- WAREHOUSES—Boston, Philadelphia, Pittsburgh, Cleveland, Detroit, Minneapolis and Houston

3426 S. KEDZIE AVENUE • CHICAGO 23, ILLINOIS
REPRESENTATIVES IN PRINCIPAL CITIES

• FREE—Write for your copy of the 24 page Lavingot Technical Journal Vol. 12 No. 1-2 containing Specifications . . . Test Bar Designs, Nonferrous Ingot & Casting Alloys, Deoxidizers, Fluxes, Anodes for Electrodeposition, Anodes - Electrotyping - Electroplating, Type Metals . . . in chart form.

RESEARCH — CONTROLLED REFINING INSURE UNIFORM QUALITY • Refiners of Brass, Bronze

and Aluminum • Producers of Zinc Base Die Casting Alloys • Deoxidizers . . . Degassifiers . . . Fluxes . . . Shots • Cast Virgin Electrolytic Copper Anodes • Type Metals

Ohio Foundries Lead in Castings Show Exhibits

■ Sparked by the success of the International Foundry Trade Fair in Dusseldorf, Germany, applications for exhibit space at the American Foundrymen's Society 1st Engineered Castings Show are being received from all segments of the castings industry.

W. N. Davis, exhibits manager, states that applications have been received from foundries making castings from gray, ductile, and malleable iron, steel, aluminum, magnesium, brass and bronze.

Manufacturers of patterns and core boxes made of wood, metal and plastics are also exhibited, along with companies making laboratory and test equipment.

Exhibitors in this show are strictly limited to four industrial groups:

- 1) Companies producing metal castings for sale.
- 2) Manufacturers of laboratory equipment for testing and quality control.
- 3) Producers of metals and alloys contributing to castings quality.
- 4) Companies producing patterns for sale.

Thus far more applications have been received from companies located in Ohio than any other state. Over half are from the two states of Ohio and Illinois.

Davis emphasizes the opportunity made possible by this exhibit for foundrymen to demonstrate their abilities to the design and production engineers who will be in attendance.

S. C. Massari, technical director of AFS, says "the technical program of papers has been broadened so as to appeal to the users and prospective users of castings in all industries". This program will be built around the theme of the show—the quality, utility and economy of castings.

Applicants for exhibit space are urged to submit requests for space to W. N. Davis, Exhibits Manager, American Foundrymen's Society, as soon as possible since the deadline is rapidly drawing near.

Safer, Saner Solvent

Foundry maintenance employees may be spared the dangers of performing cleaning operations with solvents whose vapors are toxic.

The American Industrial Hygiene Association now recommends an all but unknown solvent material, methyl chloroform, for such jobs as cleaning electric motors. This solvent is a substitute for carbon tetrachloride and is now available commercially.



NOW users of SAND TRANSMISSION PIPELINES Cut Replacement Time with Non-Welded Installations of WELD+ENDS with Clamping Screws

Replacing sand transmission piping lines is quicker, easier with non-welded installations of WELD+ENDS with clamping screws. No threading, no special make-ready is necessary. Cut the pipe—slip the WELD+ENDS on—tighten the clamping screws . . . That's all there is to it.

Non-welded WELD+ENDS are better than flanges, especially where there is frequent replacing of pipe. They can be used over and over again with only the clamping screws requiring replacement

Where pipeline vibration is severe, clamping screws may be equipped with Nylok lock nuts and Shakeproof washers as shown in the illustration.

Reusable non-welded installations of WELD+ENDS offer continuous savings in down time and repair costs. Write today for further information—also inquire about Pliedcowear erosion-resistant pipe. Address Dept. r26

THE PIPE LINE DEVELOPMENT CO.
5700 DETROIT AVE. • CLEVELAND 2, OHIO

New York Mobilizes to Cut Accidents

● The Consultative Approach. This is the weapon the castings industry in New York State and the New York State Department of Labor will use to battle the accident rate in New York foundries.

On June 12 New York's Industrial Commissioner Isador Lubin called a meeting of representatives of the foundry industry in Syracuse, N. Y. His purpose was to enlist the cooperation of men of industry in eliminating accidents in New York State.

He pointed out that approximately 70 per cent of industrial accidents in New York State occurred in situations beyond the law-enforcement power of the industrial commissioner. In other words, many accidents occur in spite of rigid inspection and safe working conditions. The majority of these accidents are due to unsafe acts of employees.

Realizing that factory inspection alone will eliminate only a minority of accidents, the commissioner sent 60 of his factory inspectors to Cornell University for safety training. These men are now known as safety advisors—not factory policemen and they have been assigned to visit all foundries of New York State, giving particular attention to those lacking full-time safety men. The purpose is to assist plants in their accident-prevention work on a wholly voluntary basis.

In inaugurating the new consultative approach in the state-wide accident prevention program, Commissioner Lubin stated that he is convinced that progress in accident prevention can best be made by co-operation between management, employees and law enforcement officers.

The first efforts of the campaign were directed to the foundry industry because: 1) It is one of the largest employers of labor. 2) It is a basic industry which is important

to the nation in terms of preparedness and national defense. 3) It is a key industry for peacetime manufacturing processes. 4) It is composed of a relatively large number of small plants.

The operational method of the consultative approach is to be as follows:

First, the safety advisor assigned to each foundry will explain to top management the purpose and method of operating the program. If management wishes to cooperate, the safety service man will proceed to the second step, that of studying the accident record of the plant in detail, in order to determine the causes of specific accidents. This phase of the procedure will also involve a careful examination of the plant's physical facilities in terms of safety hazards. On the basis of these analyses the safety adviser will prepare a report and suggest a program.

The next step is to determine how and how much of this program can be adopted and put into action.

On September 27 and 28 Governor Harriman's Worker Safety Conference was held at Albany. Over 1000 persons attended. Discussion groups representing industry, labor, insurance, professional safety, the community, and construction held separate sessions dealing with this new state safety program.

On October 5, at the invitation of the Western New York Chapter of AFS, First Deputy Commissioner Charles Halloran addressed the chapter on the consultative approach. Summarizing the objectives and conclusions of the program, Halloran praised the foundrymen's reaction as "excellent" and declared, "Each one of you is to be congratulated on the objective attitude that you have displayed and on your willingness to co-operate in this program."



Foundrymen leading Consultative Approach safety campaign: left to right, H. J. Weber, AFS; Milton Emery, chairman, Western N. Y. Chapter, AFS; and Wm. C. Stevenson, director, Eastern N. Y. Chapter, AFS.

BIN STUCK LATELY?



It takes a full flow of sand to keep casting production at a high level. When sand chutes like these plug up, production ceases. The molder gets mad, you get mad and your customers get mad.

The installation of Cleveland Vibrators will keep everybody happy. By using Cleveland Vibrators on your bins, hoppers and chutes you eliminate bridging and plugging. Write for complete information and prices.

Air or Electric

Portable or Permanent

Silent or Standard



2786 Clinton Ave. • Cleveland 13, Ohio

CIRCLE NO. 154, PAGE 7-8

December 1956 • 71



CIRCLE NO. 158, PAGE 7-8

obituaries

Deming H. Lucas, 71, manufacturers' agent, passed away November 5. Mr. Lucas was a manufacturers' representative in Chicago since 1933 and was active in the Chicago Chapter of American Foundrymen's Society, serving as a director for many years and as membership chairman from 1940-54.



M. H. Liedtke

Martin H. Liedtke, 59, general superintendent, Farmall Works Foundry, Rock Island, Ill., died suddenly October 28.

Mr. Liedtke began his career as a molder in the Farmall Works Foundry in 1927, continuing his Harvester service as foreman of the molding department until 1941, when he moved to Milwaukee Works as assistant general superintendent of the foundry. He returned to the Farmall Works in 1942 and was promoted to general superintendent in 1945.

Mr. Liedtke was a past chairman in the Quad City Chapter of AFS.

Charles Reymann, Sr., chairman of the board, Atlantic Foundry Co., Akron, Ohio passed away October 11. Mr. Reymann, who has not been active in the foundry for several years, would have been 87 this year. He was a member of the American Foundrymen's Society and the Gray Iron Founders' Society, Inc.

Herbert T. Herr, Jr., president, J. S. McCormick Co., Pittsburgh, died recently.

William J. Brennan, Sr., 76, president, Geneva Foundry Corp., Geneva, N.Y., died September 22. Mr. Brennan purchased the foundry in 1921 and operated it as president and general manager until his death.

SUMMARY OF SPECIFICATIONS FOR GRAY CAST IRONS AND NODULAR (Ductile) CAST IRONS



This summary is intended to cover the more commonly used specifications. It includes primarily mechanical properties and chemical composition where specified, but it does not present all details of the specifications. Reference to the complete specification is recommended when it is to be used in commerce. Standards such as methods of tests, recommended practices, definitions and less commonly used specifications are included in the supplementary list below.

Due to the important influence of the individual design on the characteristics of a casting, requirements such as actual strength, dimensional tolerances, and surface finish cannot be stated in a general specification. These are usually established on a most satisfactory basis by personal liaison with the foundry. Any suggestions for improvement of this summary will be gratefully received and considered for inclusion in subsequent editions.

Charles F. Walton, Technical Director
Gray Iron Founders' Society, Inc.

SUMMARY OF GRAY IRON SPECIFICATIONS

Specifying Body (1)	Spec. No. (2)	Use	Class	Min. Tensile Strength psi	Brinell Hardness	Other Requirements					Typical Applications
A.S.T.M. A.S.A.	A 190-47 G 27.1-1942	Where strength and microstructure are not a prime requisite				Specific qualities usually established by sample. Hardness and other properties may be established by agreement.					Light weight and thin section castings requiring good appearance, high machinability, and close dimensions.
A.S.T.M.	A 48-56	General castings not covered by other specifications and in which strength is a consideration. These specifications are all basically the same.				Transverse Strength (7)—Breaking Load—Min. Pounds (7)					Same as A 190 with minimum tensile requirements.
A.S.A.	G 25.1-1943										
A.S.M.E.	S 61-1948										
A.A.S.M.O.	M 105-49										
C.S.A.	S 61-1948										
Federal	QQ-4-63a										

These general specifications for gray and nodular iron are those now used in selling castings. This summary was recently published by Gray Iron Founders' Society. Further specifications are given on the next page.

foundry facts

Specifications/Gray Iron

SUMMARY OF NODULAR IRON SPECIFICATIONS

Specifying Body (1)	Spec. No. (1)	Use	Class or Grade	Tensile Strength Min. psi	Yield Strength Min. psi	% Elongation in 2" Min.	Heat Treatment	Required Analysis	Typical Applications
A.S.T.A.	A 339-33	For high strength in as-cast condition	80-60-03	80,000 (14)	60,000 (14)	3.0%			Heavy duty machinery, gears, dies, rolls for wear and strength.
A.S.T.A.	A 395-33	For toughness and machinability	60-45-10	60,000 (14)	45,000 (14)	10%	Usually annealed		Pressure castings, valve and pump bodies, compressor heads, shock resisting parts.
A.S.T.A.	A 395-33	Pressure containing parts for use at elevated temperatures	60-45-15	60,000 (14)	45,000 (14)	15%	Shall be ferritized by annealing	Total Carbon 3.0% max. Silicon 2.75% max. Phosphorus 0.008% max. Copper ---	Valves and fittings for steam and chemical plant equipment. Steam dryers, etc.
U. S. Military	MIL-17164A (Ship)	Heavy displacement and other use requiring shock resistance	60-45-15	60,000 (14)	45,000 (14)	15%	Shall be ferritized by annealing, (14) to 190 max. BHN	2.0% max. 2.50% max. 0.008% max. 4.5% (14) max.	Motor frames, ends, engine blocks, heads, compressors, valves, clamps.
A.S.T.A.	A 398-33	For maximum strength applications (obtained by heat treatment)	120-90-02 160-70-03	120,000 (14) 160,000 (14)	90,000 (14) 70,000 (14)	2.0% 3.0%	Shall be heat treated		Pistons, gears, cams, guides, tread rollers, etc.
U. S. Military	MIL-17164B (Drivetrain)	Military equipment	Class 1 Class 2 Class 3 Class 4 Class 5 Class 6	120,000 (14) 100,000 (14) 85,000 (14) 80,000 (14) 60,000 (14) 60,000 (14)	90,000 (14) 75,000 (14) 60,000 (14) 60,000 (14) 45,000 (14) 40,000 (14)	2.0% 4.0% 6.0% 3.0% 10% 15%	Properties usually obtained by a quench and temper Generally as cast Shall be ferritized by annealing	Unless otherwise specified, one metallographic test shall be made for each lot. Graphite shall appear essentially in nodule form.	

GRAY IRON PRESSURE PIPE AND FITTINGS

SPECIFYING BODY	SPEC. NO.	TITLE	PRESSURE CLASS	REQUIRED CHEMISTRY		TALBOT STRIP TEST		OTHER TESTS
				% S Max.	% P Max.	MIN. REQ. OF SUPPLY, PSI	MAX. MOD. OF ELAS. SEC/FT	
ASA (14)	A21.2 - S2	Cast iron old cast pipe for water and other liquids.	80-200	0.12	0.50	20,000	10,000,000	Hydrostatic, transverse test-bar, ring, bending
ASA (14)	A21.3 - S2	Cast iron old cast pipe for gas.	10-180	0.12	0.50	20,000	10,000,000	Hg. resistant, transverse test-bar, ring, bending
ASA (14)	A21.5 - S2	Cast iron pipe centrifugally cast in metal mold for water and other liquids.	80-200	0.12	0.50	40,000	12,000,000	Hydrostatic, hardness, ring, bending
ASA (14)	A21.7 - S2	Cast iron pipe centrifugally cast in metal mold for gas.	10-180	0.12	0.50	40,000	12,000,000	Hydrostatic, hardness, ring, bending
ASA (14)	A21.8 - S2	Cast iron pipe centrifugally cast in sand-lined mold for water and other liquids.	80-200	0.12	0.50	40,000	10,000,000	Hydrostatic, transverse test-bar, ring, bending
ASA (14)	A21.9 - S2	Cast iron pipe centrifugally cast in sand-lined mold for gas.	10-180	0.12	0.50	40,000	10,000,000	Hydrostatic, transverse test-bar, ring, bending
ASA	A21.10 - S2	Short body cast iron fittings, 2" to 12" for 200 psi water pressure plus water hammer.	200	0.12	0.50			Transverse test-bar
ASA	A21.11 - S2	A mechanical joint for cast iron pressure pipe and fittings.						Tests are those used for old cast or centrifugally cast products which cover is applicable.
AWWA	C300-907	Cast iron pressure fittings of bell and outlet type (standard dimensions given).	A, B, C, D					Transverse test-bar, 1" x 2" x 20" Min. Load 22000 psi. Cast. 0.50" to 0.60" in diameter use A, S, T, R, A-40 Class 25
Federal	WW-P-431a	Cast iron pressure fittings of bell and outlet type (standard dimensions given).	80-200 10-180 200	0.12 0.12 0.12	0.50 0.50 0.50	20, or 40,000 (14) 40,000 20, or 40,000 (14)	10, or 12,000,000 (14) 10, or 12,000,000 (14) 10, or 12,000,000 (14)	Design, weights, hardness, and hydrostatic tests specified

GRAY IRON SOIL PIPE, DRAINAGE, CULVERT PIPE, AND FITTINGS

SPECIFYING BODY	SPEC. NO.	TITLE	CLASS	REQUIRED CHEMISTRY		TRANSVERSE PROPERTIES			OTHER TESTS
				% S Max.	% P Max.	DIMENSIONS	LOAD	DEFL.	
ASA	A41.1-35	Cast iron old pipe and fittings		0.11	0.50	1.2" x 12"	1750	0.30"	Hydrostatic 60 psi Tensile strength 17,000 psi
ASTM	A74-42	Cast iron old pipe and fittings	Standard Heavy Extra Heavy	0.12 0.12 0.12	0.50 0.50 0.50				2,000 D (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)
ASA	B10.12 - 40	Cast iron old pipe and fittings		0.12	0.50				Tensile Test 21,000 psi
ASA	A41.5 - 42	Thru-drain cast iron pipe for drainage vent and waste service		0.11	0.50	1.2" x 12"	1000	0.30"	Hydrostatic Test 60 psi
Federal	WW-P-388	Pipe, cast iron; drainage, vent, and waste, (thru-drain)		0.11	0.50	Pipe up to 2" diam. must meet transverse test on 2" diam.			Talbot strip test for pipe 4" and larger Min. Load 40,000 psi. Cast. 0.50" to 0.60" in diameter use A, S, T, R, A-40 Class 25
Federal	WW-P-461	Pipe & fittings, cast iron		0.11	0.50	1.2" x 12" (14)	1000	0.30"	Hydrostatic Test 60 psi
Federal	WW-P-461a	Pipe & fittings, cast iron, drainage		0.12	0.50				Air Test 60 psi

GRAY IRON PIPE, FITTINGS, VALVES, FLANGES

SPECIFYING BODY	SPEC. NO.	TITLE	CLASS	REQUIRED CHEMISTRY		TENSILE TEST MIN. PSI	OTHER TESTS
				% S Max.	% P Max.		
ASTM	A150-42	Gray iron castings for valves, flanges, and pipe fittings	A B C	0.12 0.12 0.12	0.75 0.75 0.75	21,000 21,000 21,000	22000 Min. Load 0.12" Min. Cast. 1.2" x 12" bar
ASA	B10.12 - 40	Cast iron old pipe and fittings	1200 1200	0.12 0.12	0.75 0.75	21,000 21,000	
Federal	WW-P-388a	Pipe fittings, cast iron (approved) 120 and 200 pound	1200 1200	0.12 0.12	0.75 0.75		Air Test of 60 Psi or Hydrostatic Test 200 psi
Federal	WW-P-461	Valves, cast iron gate 125 and 200 pound standard or flanged (for land use)	A B	0.12 0.12	0.75 0.75		Hydrostatic Test (same design pressure ratings)
U. S. Navy	48-2-38	Fittings pipe, large (steel) flanged	A-1200 B-2000	Not Specified	Not Specified		Air Test 60 psi

FOOTNOTES:

(1) Names and addresses are given on reverse side.
(2) The size of test bar shall be determined by the controlling section of the casting as follows:

Controlling section of casting	Test Bar	Bar Diameter Inches	Bar Length Inches
0.5" & under	A	0.875	15
0.5" to 1.0"	B	1.30	21
1.0" to 2.0"	C	2.00	27
Over 2.0"	C bar or longer size by agreement.		

(14) These ASA specifications are sponsored by:

The American Iron Association
The American Society for Testing Materials (Spec. A-27-44-F)
The American Water Works Association
The New England Water Works Association

(15) May be used by agreement in place of tensile strength.

(16) Properties in 1.2" diameter test bar unless otherwise specified.

(17) The first number of most qualifications indicates the year of latest revision.

(18) The graphite shall be of type A, size 2 to 4 (see ASTM-A 307 Evolution of Microstructures). The matrix shall be lamellar pearlite. Ferrite, if present, not to exceed 10%.

(19) The graphite shall be type A, size 3 to 5 (see ASTM-A 307 Evolution of Microstructures). The matrix shall be of fine lamellar pearlite with fine cementite, fine ferrite, or both not to exceed 5%.

(20) Classes B through D are also covered but limited to use below 600° F.

(21) Carbon Content Restricted to not more than follows:

C.E. = 0.12, C = 0.33, Si = 0.12, P = 0.01

(22) Low strength iron is desired for thermal shock resistance. Where strength is essential, tensile strength may be specified.

(23) Chromium, if required may be degraded to range by type cast

Type % Cr

A 0.20 to 0.40

B 0.40 to 0.60

C 0.60 to 0.80

D 0.80 to 1.00

(24) Test specimen shall be conditioned from a 1" flat finish or a 7" finish in 1/2", 1", or 2" size by series of sanding.

(25) As determined by "oil-out method" at 0.2%.

(26) Applies to castings with sections 2" and over. EE = Y, 0.4 to 0.6, B.

(27) One metallographic test shall be made for each lot after annealing. The results shall be satisfactory. The matrix is a min. of 80% ferrite with no primary carbides.

(28) Determined by the section-and-test or by the 0.1% "oil-out method."

(29) Test samples shall be conditioned from 1/2", 1", or 2" V blocks of specified dimensions, whichever approximate original section of casting.

(14) Depending upon whether cast or centrifugally cast.

(15) Depending upon whether cast in mold or sand-lined mold.

(16) Tests in accordance with Federal specification QQ-A-362.

Issued 6-28-50

Revised 7-10-50

The feather-touch with DYNAMITE ACTION!



**MORE EFFECTIVE
THAN EVER—
MARLA
AERO SPRAY
PENETRATING OIL**

**Gives you these
advantages:**

- 1. SPRAY.** Assures penetration, with pressure, to the most hard to get at objects. Shoots a stream three feet if needed.
- 2. SPEED.** Always ready at the touch of a button. The fastest non-acid, non-alkali penetrating oil known or money back.
- 3. ECONOMICAL.** Spray container eliminates wasted surplus and time in application. Cannot leak or spill.
- 4. HANDY.** Carried easily and is always ready for use. No chance for ingredients to weaken by exposure to air from a misplaced cap.
- 5. VERSATILE.** Marla Spray Penetrating Oil is used to free the most corroded bolts, screws, pipe threads, bearings, pulleys, manifolds, valve guides, locks or any other stuck together metal parts.

Case of six 12 ounce cans \$ 9.00
Case of twelve 12 ounce cans \$17.40
PRICES F.O.B. ST. LOUIS

ROTHLAN CORPORATION

Dept. NHD 3618 Laclede Ave. St. Louis 8, Mo.
Specialists in Fine Penetrating Oil for Over Thirty Years

CIRCLE NO. 163, PAGE 7-8

MARLA OPEN GEAR SPRAY LUBRICANT



**Use on all Gears not running in Oil
Absolutely Nothing Else Like It!
Sticks to Metal and
OUTLASTS ORDINARY LUBES 5-to-1**

- 1. ECONOMICAL.**—Spray container reduces lubrication time. Long lasting film. One can covers approximately 25 sq. ft. of surface with no waste.
- 2. HEAVY-DUTY.**—The finest extreme pressure adhesive lubricant there is for open gears.
- 3. EASY-TO-USE.**—No fuss . . . no muss. Ease of application encourages and assures complete lubrication of open gears.
- 4. CLEAN.**—No drip . . . no throw off . . . no clean up of excess lubricant. Will not drip in hot or steamy areas.
- 5. SPRAY.**—Assures perfect lubrication even to the most hard-to-get-at areas.
- 6. HANDY.**—Marla Spray Lubricant can be carried easily and is always ready for use. Eliminates the brush, paddle or any preheating.
- 7. VERSATILE.**—A superior lubricant also for cams, reciprocating actions, mono rails, guides, chains, sprockets and cables.

Prices F.O.B. Your Plant
Case of Six—12 Ounce Cans \$10.74
Case of Twelve—12 Ounce Cans 21.00
Jobber Inquiries Invited

Manufactured and Guaranteed by

ROTHLAN CORP. 3618 Laclede Ave.
DEPT. NHD St. Louis 8, Mo.

CIRCLE NO. 164, PAGE 7-8

Corp. in 1921 and operated it as the Geneva Fdy. Corp. in the capacity of president and general manager until the time of his death.

Clair Upthegrove, professor emeritus of metallurgical engineering, University of Michigan, passed away October 11. He joined the staff in 1916 and for many years was the senior metallurgist on the University's staff.

Joseph F. Ryan, assistant secretary and assistant treasurer of Allis-Chalmers Manufacturing Co. since 1933, died suddenly October 23. He was 61 years old.

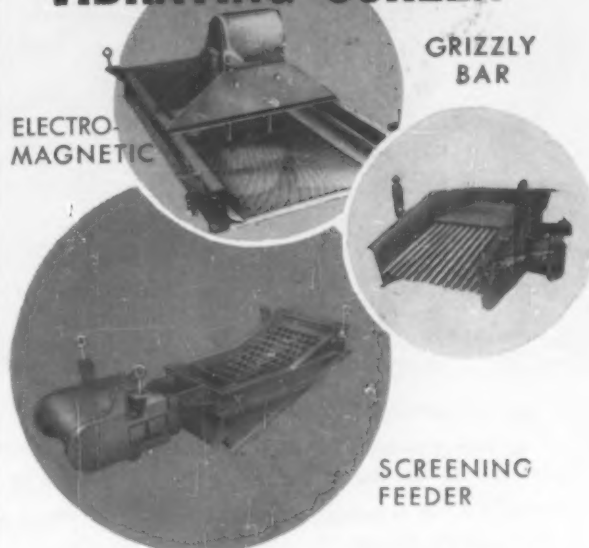
Mr. Ryan started his career at Allis-Chalmers in the treasurer's division in 1915. He had a long record of associations with many community enterprises, was officer and director of the Navy League. He received a medal for patriotic service from the U.S. Treasury department for his part in war bond drives at Allis-Chalmers during World War II.

George J. Golden, president of Golden's Foundry and Machine Co., Columbus, Georgia, passed away October 18.

STATEMENT OF OWNERSHIP

Statement required by the Act of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) showing the ownership, management, and circulation of MODERN CASTINGS, published monthly at Pontiac, Ill., for October 1, 1956. 1—The names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Ill.; Editor, Jack H. Schaum, Golf & Wolf Roads, Des Plaines, Ill.; Managing Editor, Paul R. Foght, Golf & Wolf Roads, Des Plaines, Ill.; Business Manager, Curtis G. Fuller, Golf & Wolf Roads, Des Plaines, Ill. 2—The owner is: American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Ill., organized not for profit, without stock. Principal officers: President, Frank W. Shipley, Caterpillar Tractor Co., Peoria, Ill.; Vice-President, Harry W. Dietert, Harry W. Dietert Company, Detroit, Mich.; Secretary-Treasurer and General Manager, William W. Maloney, American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Ill. 3—The known bondholders, mortgages, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: none. 4—Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner. Curtis G. Fuller, Business Manager. Sworn to and subscribed before me this 20th day of September 1956 (Seal). E. R. May, notary public. (My commission expires March 14, 1960.)

There is a **SYNTRON** VIBRATING SCREEN



for every screening problem

Syntron designs and builds screens for practically every screening application in many industries—mining, chemical, food, etc. Replaceable screening surfaces from 80 mesh to 3/4" openings.

- **Pulsating Magnet Screens**—provide effective low cost sizing of medium tonnage materials.
- **Grizzly Bar Screens**—increase efficiency of any operation requiring scalping or coarse screening of heavy tonnage material.
- **Screening Feeders**—utilize, powerful electromagnetic drive to size, dewater, desludge, desilt, dedust bulk materials. Screens up to 3" material size.

GASOLINE HAMMERS

Self-contained, easily portable for one man. Drills 2 feet per minute, blows holes clean down to 13 feet. Automatic rotation of drill steels.



TEST SIEVE SHAKERS

Provide accurate, high speed sizing of test samples. Positive control of time for uniform testing. Electromagnetic drive.

Write for Catalogue Data—FREE

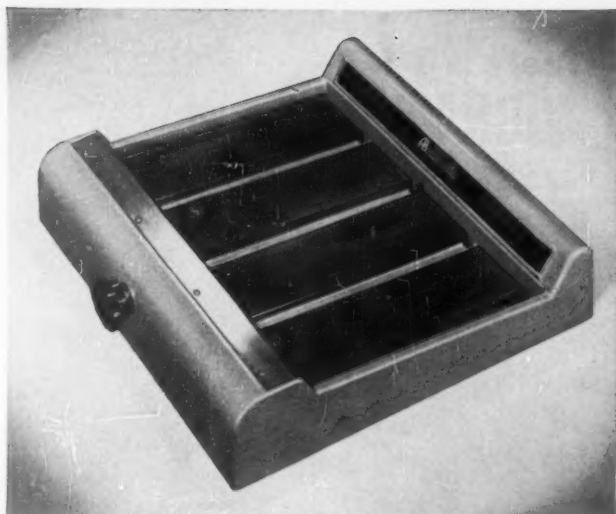
SYNTRON COMPANY

545 Lexington Avenue

Homer City, Penna.

CIRCLE NO. 165, PAGE 7-8

December 1956 • 75



No. 1470 AB HANDIMET GRINDER, complete \$98.00

No. 1469-SW AB HANDIMET GRINDING PAPER for 1470 Grinder,
Grits 240, 320, 400, 600 per 100...\$10.00

No. 1469-I-SW AB HANDIMET GRINDING PAPER assorted 10 each
grits 240, 320, 400, 600...\$4.50

1470 AB HANDIMET GRINDER

A New, Wet Hand Grinder for
Metallurgical Samples

Now you may have wet grinding facilities for hand preparation in your laboratory at a nominal cost. Convenience at your fingertips, always clean and ready for use. Simply attach to water and drain facilities.

Individual elevated hard glass grinding surfaces are continually flushed with streams of water. This floats off the surface removal products, provides lubrication, and leaves sharp abrasive edges exposed at all times. A control valve permits complete selectivity of the volume of water. Ample drainage facilities with standard pipe fittings are provided at the rear. The grinding platforms are pitched downward and away from the operator.

The Handimet Grinding Paper is coated with a pressure sensitive adhesive backing and firmly holds when merely pressed against the flat grinding surface. It is easily removable when sheet is worn.



Buehler Ltd. METALLURGICAL APPARATUS

2120 Greenwood St., Evanston, Illinois, U.S.A.

CIRCLE NO. 160, PAGE 7-8



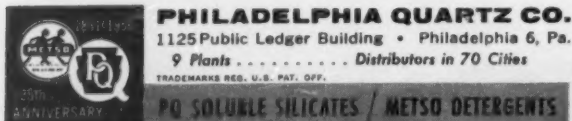
**125 YEARS
IN CHEMICAL
SERVICE...**

SOAP TO SILICATES

Soap, our first product in 1831, was followed 25 years later by silicate of soda used in our soaps. Silicates became our exclusive interest in 1904.

PQ research in special silicate properties has uncovered and developed new silicates for many valuable uses such as detergents for metal cleaning, sealants for porous castings, binders for cements.

Choose from our 40 products, liquid and dry ($2\text{Na}_2\text{O}:\text{SiO}_2$ to $\text{Na}_2\text{O}:3.75\text{SiO}_2$), a silicate for every need.



CIRCLE NO. 169, PAGE 7-8

FOR CLEAN, DRY AIR



**MURPHY TRIUMPH AA
SEPARATOR-FILTER**
Sizes: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1
Weight 30 lbs; Pressures:
0 to 125 psi
Price: \$81.65 ea; Desiccant
refills \$1.00 ea.

After precooling and separating compressed air, this small unit, placed close to the point of use will finish the job of removing last traces of impurities.

Where very particular work demands dry air completely free from any trace of oil or vapors Murphy Triumph AA is the answer.

**AFTERCOOLERS FOR 10 CFM TO
10,000 CFM—SEPARATORS—TRAPS**

JAS. A. MURPHY & CO. INC.

East High Street, Hamilton, Ohio

CIRCLE NO. 168, PAGE 7-8

afs chapter meetings

DECEMBER

3 . . Chicago . . Chicago Bar Assn., Chicago. Round Table Meeting. Gray Iron and Patterns Div.: W. T. Schmidt, Giddings & Lewis Machine Co., "Casting Design and Lower Casting Cost," Malleable Iron Div.: R. Greenlee, Auto Specialties, "Control to Eliminate Hot Tears;" Steel Div.: Richard Ames, Illinois Carnegie Steel Co., "Practical Testing & Selection of Refractories;" Non-Ferrous & Maintenance Engineering Div.: W. O. Hanson, Allis-Chalmers Co., "Noise, Vibration, Smoke."

3 . . Central Indiana . . Athenaeum Turners, Indianapolis. Representatives from eight local foundries, "Know Your Area Foundries."

4 . . Rochester . . Seneca Hotel, Rochester, N.Y. Earl E. Woodliff, Foundry Sand Engr., "Ways to Improve Your Foundry Sands."

5 . . Toledo . . Heather Downs Country Club, Toledo, Ohio. L. W. Thayer, Cadillac Motor Car Div., General Motors Corp., "Gray Iron Gating."

6 . . Saginaw Valley . . Fischer's Hotel, Frankenmuth, Mich. Saginaw Valley Foundry Night. J. Stout, Buick Fdy.; R. Foster, Bay City Fdy.; H. McClelland, Eaton Fdy.; R. Klawuhn, Genesee Fdy.; F. Strieter, Dow-Midland.

6 . . Canton District . . American Legion Hall, Massillon, Ohio. Ladies Night.

7 . . Washington . . Seattle Town and Country Club, Seattle. Ladies Night.

7 . . Tri-State . . Tulsa, Okla. Christmas Party.

7 . . Northeastern Ohio . . Hotel Carter, Cleveland. Christmas Party.

8 . . Central Michigan . . Hart Hotel, Battle Creek, Mich. Christmas Party.

8 . . Twin City . . Leamington Hotel, Minneapolis. Christmas Party.

8 . . Central Ohio . . Lincoln Lodge, U. S. Rt. 40, near Alton, Ohio. Christmas Party.

8 . . Central Illinois . . American Legion Hall, Peoria, Ill. Christmas Party.

8 . . Mexico . . Restaurant Chapultepec, Mexico City, Mexico. Ladies Night.

10 . . Timberline . . Denver, Colo. Christmas Party.

10 . . Michiana . . Club Normandy, Mishawaka, Ind. G. W. Anselman, Whirl-Air-Flow Corp., "Pneumatic Sand Handling."

14 . . Oregon . . Amato's Supper Club,

Portland, Ore. Christmas Party.

14 . . Metropolitan . . Essex House, Newark, N.J. Christmas Party.

14 . . Wisconsin . . Schroeder Hotel, Milwaukee, Wis. Christmas Party.

14 . . Southern California . . Roger Young Auditorium, Los Angeles. Local Problem Casting Clinic and Christmas Party.

15 . . Corn Belt . . Rome Hotel, Omaha, Nebr. Christmas Party.

18 . . Connecticut . . Waverly Inn, Cheshire, Conn. Christmas Party with Connecticut Non-Ferrous Foundrymen's Assn.

21 . . Ontario . . Royal Connaught Hotel, Hamilton, Ontario. Panel Meeting. J. H. King, Archer-Daniels-Midland Co.; V. H. Furlong, Foundry Services (Canada) Ltd.; W. Moggeridge, Ford Motor Co., Ltd., "New Developments in Coremaking."

22 . . Cincinnati District . . Netherland-Hilton Hotel, Cincinnati. Christmas Party.

JANUARY

3 . . Saginaw Valley . . Fischer's Hotel, Frankenmuth, Mich. T. Barlow, Eastern Clay Products Corp., "High Pressure Molding."

4 . . Corn Belt . . Rome Hotel, Omaha, Nebr. O. C. Bueg, Arrow Pattern and Engrg. Co., "Patterns."

7 . . Chicago . . Chicago Bar Assn., Chicago. A. L. Boegehold, Research Staff, General Motors Corp., "Materials in the Automobile of the Future."

7 . . Central Illinois . . American Legion Hall, Peoria, Ill. C. E. Drury, Central Foundry Div., Saginaw Malleable Iron Plant, General Motors Corp., "Gating to Control Pouring Rate and Its Effect on the Casting."

7 . . Central Indiana . . Athenaeum Turners, Indianapolis. T. E. Barlow, International Minerals & Chemical Corp., "Getting the Most Out of Green Sand."

8 . . Twin City . . The Covered Wagon, Minneapolis. H. F. Randolph, Mexico Refractories Co., "Foundry Refractories."

9 . . Toledo . . Heather Downs Country Club, Toledo, Ohio. Tom Egan, Cooper-Bessemer Corp., "Nodular Iron."

11 . . Philadelphia . . Engineers' Club, Philadelphia. Casting symposium to be held in the afternoon before meeting. C. A. Sanders, American Colloid Co., "Casting Finish, Precision and Tolerance."

14 . . Central Ohio . . Seneca Hotel, Columbus, Ohio. Warner Bishop, Archer-Daniels-Midland Co., "Common Sense in the Corerom."

14 . . Michiana . . Club Normandy, Mishawaka, Ind. J. A. Gitzen, Delta Oil Co., "Core and Mold Sand Additives."

16 . . Central Michigan . . Hart Hotel, Battle Creek, Mich. Youth Encouragement Night.

Announcing an outstanding foundry equipment

SALE

Unused: **Three 78" cupolas with accessories**
(Whiting No. 8, Model B)

Priced well below market value . . . for immediate sale

Special to foundry operators: If you have plans for expansion or plan to replace worn-out equipment, act now on this outstanding opportunity. Phone or wire to arrange for inspection. Dealer inquiries invited.

Contact:

H. W. Christensen
120 Montgomery Street
Columbia-Geneva Steel Division
United States Steel Corporation
San Francisco 6—Phone SUTTER 1-2500

Description of unused equipment for sale:

QUANTITY	ITEM	QUANTITY	ITEM
3 EACH	Whiting No. 8 Model B Cupolas having a shell diameter of 78" and to be lined to 60". Also equipped with refractory lined iron runners, cast iron wishbones for use in charging, and bottom door lifting devices.	2 EACH	Motor driven desulphurizing ladles, "U" type, 44"x126", 40 ton capacity complete with covers, refractory lining, gears, gear guards, and bearing stands except that 1 bearing cap, 2 Hyatt bearings and 10 large bolts are excluded. Also excluded are exhausters fans and driving units. However, one drive unit base and gas preheaters are included.
3 EACH	Drop bottom charging buckets 48" I.D. by 48".		
3 EACH	Foundry Whiting Allis-Chalmers cupola blowers rated to deliver 7100 cfm at 24 oz. and at 5,000 feet altitude. Normal rating at sea level 8,600 cfm at 32 oz. Complete with electric motors.	2 EACH	Whiting standard hoods and 24" I.D. stacks including piping jib supports for location over desulphurizing ladles.
3 EACH	Standard Whiting 42" top diameter slagging ladles complete with trunnions, spur geared tilting mechanism, and standard truck for 30" gage track. Also included are one additional ladle complete except for wheels and axles, and one spare ladle only.	1 EACH	Batch weigh hopper for metal to use in making up cupola charges complete with air operated cylinder for opening during discharge. Also equipped with Fairbanks Morse scale and platforms.

Location of equipment: Geneva Works, Provo, Utah
Columbia-Geneva Steel Division • United States Steel Corporation



CIRCLE NO. 174, PAGE 7-8



After more than 500,000 tons

"The Ringlift has helped us more than any other piece of equipment we have ever purchased," says General Manager of this leading Midwestern gray iron jobbing foundry.

This very hot, hard, lumpy sand is prepared, tempered and cooled by the Ringlift without prior addition of water. The sand is mixed, screened, magnetically cleaned, thoroughly aerated and cooled.

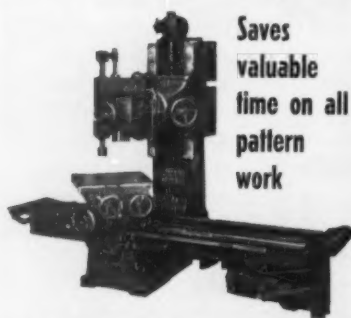
This foundry also uses the Ringlift daily to prepare several tons of thoroughly aerated facing sand.

Larger windrows than that above, even large piles, can be handled easily with the Ringlift. Hidden castings in the sand cannot damage it. No shearpins to replace.

You, too, can benefit by preparing your sand properly, right on the floor where it will be used. Investigate Ringlift today.

STATES ENGINEERING CORPORATION
922 W. Berry St., Ft. Wayne, Ind.
CIRCLE NO. 162, PAGE 7-8

OLIVER Pattern Miller



Saves valuable time on all pattern work

Wherever it is used, the Oliver No. 103 Pattern Miller makes notable reductions in pattern costs. It is unmatched for core box work, grooving, trenching, jointing, routing, gear cutting and general work. And it handles this work with extreme accuracy and ease. Even small jobs can be handled economically on this Oliver Pattern Miller. Write for Bulletin 103.

Oliver makes an extensive line of fine woodworking machines for pattern shops.

OLIVER MACHINERY COMPANY
GRAND RAPIDS 2, MICH.
CIRCLE NO. 166, PAGE 7-8

78 • modern castings

Classified Advertising

For Sale, Help Wanted, Personals, Engineering Service, etc., set solid . . . 25c per word, 30 words (\$7.50) minimum, prepaid.

Positions Wanted . . . 10c per word, 30 words (\$3.00) minimum, prepaid. Box number, care of Modern Castings, counts as 10 additional words.

Display Classified . . . Based on per-column width, per inch . . . 1-time, \$18.00; 6-time, \$16.50 per insertion; 12-time, \$15.00 per insertion; prepaid.

Help Wanted

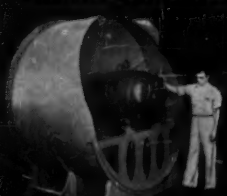
FOUNDRY MANAGER

Man 35-45 thoroughly familiar with metallurgy and foundry practice for non-ferrous foundry producing valves and similar components. Send photo and complete work history including compensation requirements.

Lester B. Knight & Associates, Inc.
549 W. Randolph Street
Chicago 6, Illinois

FOUNDRY SUPERINTENDENT. To supervise Molding, Core and Cleaning Departments of one of the most progressive jobbing steel foundries in the Middle West, currently producing approximately 700 tons of steel castings per month. Must be familiar with heavy floor molding, roll-over machines, and squeezers. Prefer age bracket 30 to 45. Should be a college graduate. Contact R. L. Gilmore, President, Superior Steel & Malleable Castings Co., Benton Harbor, Michigan.

New and Rebuilt FANS—BLOWERS EXHAUSTERS



Save 30% to 50% on Stock Shipments

We can supply all leading makes of — Rotary Positive Blowers — Turbo Blowers — Centrifugal Fans — Steel Plate Exhausters — fully guaranteed. Whether you need 1 cu. ft. of air or 100,000 we have the blower to do it. We have had 28 years of exclusive rebuilding experience on this type of equipment.

WRITE OR WIRE
Send us your requirements or write for complete listings.



WM. W. MEYER & SONS

8279 Niles Center Road
SKOKIE, ILLINOIS
Chicago Phone: INdependence 3-5127

CIRCLE NO. 177, PAGE 7-8

MAINTENANCE FOREMAN

Experienced in foundry maintenance. Modern mechanized plant. Good working conditions. Pensions. Health & life insurance. Paid holidays and vacations. Please state experience, age and expected salary. Write to Box C194, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

FOUNDRY TECHNICIAN OR QUALITY CONTROL ENGINEERING ASSISTANT
Mechanized gray iron foundry in Ohio producing quality engineering jobbing castings. Applicant should have some technical background, training or experience in one or more of the following fields—Metallurgy, Cupola Control, Sand Control, Gating and Riserling. This position will offer many opportunities in increasing efficiency and control on all foundry operations including practical research, development and application on new foundry processes such as shell process and CO₂ process. Earnings will be dependent on qualifications and ability. Box C160, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

FOUNDRY SUPERINTENDENT

Experienced man thoroughly familiar with metallurgy and foundry practice for non-ferrous foundry producing valves and similar components. Age 35-45. Send photo and complete work history including compensation requirements.

Lester B. Knight & Associates, Inc.
549 W. Randolph St.
Chicago 6, Illinois

FOUNDRY DEVELOPMENT ENGINEER. Well established research organization in the gray iron castings field has an opening for a development engineer interested in application of results of research to plant practice. Engineering training with at least 3 to 5 years plant experience highly desirable. Applicant should have an interest in the technical aspects of all phases of foundry practice with principal interests in sands, gating and risering. Some traveling involved. Must have ability to write concise reports and exercise initiative in carrying out a project. In reply, give educational background, foundry experience and brief biographical sketch. Address Box C192, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

WANTED—PATTERN SALES REPRESENTATIVE. Modern, well-equipped and established pattern shop with A-1 rating in middle west, 75 miles from Ohio-Indiana and Kentucky lines. Need patternmaker with some foundry experience along with a practical and technical experience in wood and metal patternmaking to expand our sales force. Should be able to quote pattern prices and handle customer relations in 150 mile area. Would consider training the right man. Salary open. Please submit resume and salary expected. All replies kept confidential. Box C185, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

COMMISSION SALESMAN to sell gray iron castings for foundry located in Delaware Valley, Pa., Box C195, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

FOUNDRY FOREMAN for Northern Ohio gray iron foundry employing 45 men on jobbing work. Opportunity for ambitious young man to supervise molding and core-making. Send complete resume including age, weight, height, experience, salary desired, references, etc. Box C193, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

MAINTENANCE ENGINEER for Northern Ohio iron and steel foundry employing 200 men. Jobbing foundry. Familiar with furnace, Morgan cranes, plant layout and production. Send complete resume including age, weight, height, experience, salary desired, references, etc. Box C200, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

POSITIONS WANTED

PRODUCTION MANAGER. 10 years experience in mechanized, ferrous, non-ferrous alloy foundries, pouring up to 125 tons daily, desires position in Western states area. Box C196, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

SUPERINTENDENT-FOREMAN. Fully qualified to take complete charge of all foundry operations. Broad experience with castings up to 10 tons. Superintendent of major jobbing foundry last four years. Resume sent on request. Box C197, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

GRADUATE METALLURGICAL ENGINEER. Six years experience in large ferrous foundry. Desires enlargement of present supervisory position. Quality control or production management. Ferrous or non-ferrous. Age 33. Will re-locate. Box C198, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

Man with thirty years foundry experience, last fourteen years in supervision and general management, would like position selling foundry materials or machinery to foundries or a supervisory position in production foundry. For more information write to Box C199, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

FOR SALE

One completely Automatic Sludge Ejector Tank Model #26CV. LIKE NEW. Can be adapted to a washer type dust collecting system to permit re-circulation of water. Manufactured by the Whiting Corporation, Harvey, Ill. Has been used for experimental purposes only. Di-Noc Chemical Arts, Inc., 1700 London Road, Cleveland 12, Ohio.

One Taccone pressure molding machine for 12x18 flask with 50 sets steel flasks built for machine. Arthur Harris & Co., 210 N. Aberdeen St., Chicago 7, Illinois.

FURNACES FOR SALE

10 used Heat Treating Furnaces, and two 7-ton gantry cranes, good condition, priced to sell.

BAER STEEL PRODUCTS, INC.
Box 1428
Boise, Idaho

ENGINEERING SERVICE

EARL E. WOODLIFF,
Foundry Sand Engineer.
Consulting . . . Testing.
14611 Fenkell (5-Mile Rd.)
Detroit 27, Mich.
Res. Phone Vermont 5-8724

SESSIONS ENGINEERING CO.

Consulting Foundry Engineers
Modernization, Processing Layouts
Cost Reduction Quality Control
Product—Machine Control
Architectural Design
One North La Salle St., Chicago 2, Ill.

MATERIALS HANDLING COST REDUCTION
A preliminary survey without charge will determine the potential savings and the cost. We invite Your Inquiry

Gemar Associates
CONSULTING
MATERIALS HANDLING ENGINEERS
Greenwich Connecticut
Over 20 years experience



What AFS fineness does the sandman use?

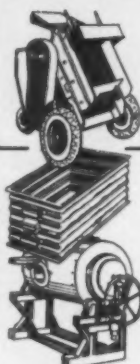
Welding Rod Specifications

Specifications covering fillers used in welding various materials have been released by the American Welding Society and the American Society for Testing Materials.

One specification covers materials for welding gray iron, malleable iron and some alloy cast irons. Sixteen classifications of filler are covered for metal-arc carbon-arc and oxy-acetylene welding.

A second specification covers bare filler metals for the welding of nickel and high-nickel alloys. Thirteen classifications are listed for materials which may be applied by five welding processes.

Copies of the specifications may be obtained for 40 cents each from the American Welding Society, 33 W. 39th St., New York 18, N. Y.



EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

14919 SARANAC ROAD

CLEVELAND 10, OHIO

CONVEYORS:

Apron Conveyors:

Midwest—36" x 120'
Palmer-Bee—21" x 5'6"

ROLLER CONVEYOR

14", 16", 18"

MOLD CONVEYORS:

1—Webb Heavy Duty 356', 109 Cars 32" x 39"
1—Link Belt 200' long, 35 Cars 38" x 72"

ANNEALING FURNACE:

Loftus Engineering, Pusher type, gas fired, recirculating complete with all controls, overall dimensions: 45' lg. x 10' wide x 12' high.

TUMBLING MILLS:

60" x 72" Ransohoff tumbling type wet cleaning mill, Serial No: 6318, drive 15 HP and bucket loader 5 HP 3/60/220.

MAGNESIUM CLEANING CABINETS:

6—Whirlpool Duplex, 8000 CFM, 100" wide x 65" deep x 90" high. Buffalo exhausters—7½ HP, 220/440/3/60.

JOLT SQUEEZE STRIP MOLDING MACHINES:

SPO—2—#2136
Osborn—2—#724
Nicholls—2—Model 24-54D



ASK FOR OUR
COMPLETE
LISTING NO. 1256

BLAST CLEANING EQUIPMENT

1—American Wheelabrator, 48" x 42" with Skip Bucket Loader.
2—Pangborn Blast Barrels, #2-GF.
1—Pangborn type MTS Cabinet with Table
2—Pangborn Type EN-2 Cabinets

FOR SALE NOW . . .

In Bellville, Ohio, 10 miles south of Mansfield a complete gray iron foundry with No. 7 Whiting cupola, 18,000 sq. ft. with railroad siding.

WE BUY AND SELL ONE PIECE OF EQUIPMENT OR COMPLETE FOUNDRIES.

ALL SIZES OF MOLDING MACHINES—JOLT ROLLOVERS, JOLT STRIP, SQUEEZERS, ETC.

GUARANTEED USED FOUNDRY EQUIPMENT . . . GLENVILLE 1-1222

QUALITY UP—COST DOWN—through

"STATISTICAL QUALITY CONTROL FOR FOUNDRIES"

Modern industry, built upon mass-production methods, has constantly searched for a system of quality control which is rapid, economical, and capable of maintaining certain standards of quality. The purpose of quality control is to aid in IMPROVING QUALITY, LOWERING COSTS, and MAKING SUPERVISION EASIER.

Chapter headings include:

- Sand Control Applications
- Melting Practice
- Quality Control Applications in the Corerom
- Applications in Molding Practice
- Pouring Practice
- Installing the Quality Control System & Training Personnel
- Calculations Involved in Quality Control
- Acceptance Sampling

128 pp. 66 figures 15 tables

Member Price \$4.50 Non-Member Price \$6.75

O.K. Send me a copy of "Statistical Quality Control."

I enclose \$_____ to cover.

☐ Please send invoice.

Signed _____

Mail to: Book Dept., American Foundrymen's Society,
Golf & Wolf Roads, Des Plaines, Ill.

M. HOLTZMAN METAL CO.

SMELTERS AND REFINERS
SINCE 1900

HOLMCO

GUARANTEED Brass, Bronze and
ALUMINUM INGOT to your specifications
IMPROVED WITH FACTOR "X"!

Send us a sample order! If you want to improve the quality of your finished products at no additional cost . . . let us show you what HOLMCO ingot, improved with Factor "X" can mean to you!

5223 McKISOCK AVE., ST. LOUIS, MO.

Chestnut 1-3820

WEDRON

**A COMPLETE LINE OF 24 DIFFERENT
PROCESSED SILICA SANDS**

**A CONTROLLED GRADE
FOR EVERY CASTING NEED!**

SAND SPECIFICATIONS — REPRESENTATIVE SCREEN ANALYSES

Unground Sand	4098	4085	4060	4040	4030	4020	5040	5030	5025
Ret on 20 Mesh	2.2								
Thru 20 ret on 30	38.6	12.4	5.6	0.6	0.4	0.4			
Thru 30 ret on 40	57.6	70.8	56.2	37.2	30.2	21.2	4.0	1.2	0.6
Thru 40 ret on 50	1.4	16.3	34.8	52.0	55.8	51.4	34.8	30.4	23.8
Thru 50 ret on 70	0.2	0.5	2.8	9.0	11.4	20.6	44.4	48.2	42.0
Thru 70 ret on 100			0.6	1.0	1.8	5.2	14.4	17.8	26.4
Thru 100 ret on 140				0.2	0.4	1.0	2.0	2.0	6.2
Thru 140 ret on 200						0.2	0.4	0.4	0.8
Thru 200 ret on 270									0.2
Grain Fineness (AFS)	25.88	30.49	33.72	37.48	38.82	42.22	49.96	51.64	56.90

Unground Sand	5015	5010	5005	7030	7020	7010	C-30	C-10
Ret on 20 Mesh								
Thru 20 ret on 30								
Thru 30 ret on 40	1.2	0.4	0.2	0.2	0.2			
Thru 40 ret on 50	15.2	11.2	4.4	3.0	2.4	0.4		
Thru 50 ret on 70	40.2	35.2	31.2	26.2	18.0	8.2	0.4	0.2
Thru 70 ret on 100	35.4	37.4	41.2	42.0	45.0	46.6	28.4	8.4
Thru 100 ret on 140	6.4	10.8	15.4	16.4	20.0	23.2	44.8	50.2
Thru 140 ret on 200	1.2	4.0	5.6	9.6	11.0	15.4	18.8	28.2
Thru 200 ret on 270	0.4	0.8	1.4	1.8	2.4	4.2	5.0	8.8
Thru 270 ret on 325		0.2	0.6	0.8	1.0	2.0	2.6	4.2
Grain Fineness (AFS)	60.20	66.92	73.92	79.36	84.42	95.44	108.22	124.60

Ground Sand (Flour)	80M	100M	140M	200M	300M	325M	400M
Ret on 60 Mesh	10/20%						
Thru 60 ret on 100	25/30%	5%					
Thru 100 ret on 140	15/20%	14%	4%	1%			
Thru 140 ret on 200	10/15%	16%	6%	4%	2%	Trace	
Thru 200 mesh	25/40%						
Thru 200 ret on 270		10%	12%	6%	2%	0.5%	Trace
Thru 270 ret on 325		12%	8%	9%	11%	4.5%	2%
Thru 325 mesh		43%	70%	80%	85%	95.0%	98%

**FINE SHELL MOLDING SANDS
STANDARD CASTING SANDS — BLASTING SANDS
SILICA FLOUR — LIGHT METAL CASTING GRADES**

Wedron offers you a complete line up of casting sands — anything needed for every casting need! This means you get the advantages of one source of supply for all the sand you need — sand of the highest quality, too.

Now this Wedron quality stems from two factors. First is the naturally rounded grain sand of the Ottawa-Wedron district (this is held to be

one of the purest silica sand deposits in the nation). Second is the modern, completely equipped Wedron plant, which turns out a superior silica product and makes all grades available.

Look to Wedron for the complete line of quality casting sands.



WEDRON SILICA COMPANY
MINES AND MILLS IN THE OTTAWA-WEDRON DISTRICT
135 SOUTH LASALLE STREET, CHICAGO 3, ILLINOIS

advertisers and their agencies

Allied Chemical & Dye Corp.	64
Air Conditioning, Heating & Ventilating	67
Ajax Electrothermic Corp.	59
Agency—Harry P. Bridge Co.	
American Foundrymen's Society Book Dept.	79
Apex Smelting Company	Back Cover
Agency—Doremus & Co.	
Archer-Daniels-Midland Co.	12 & 13
Agency—The Bayless-Kerr Co.	
Beardsley & Piper	
Div. Pettibone Mulliken Corp.	17
Agency—Ladd, Southward & Bentley, Inc.	
Buehler Ltd.	76
Agency—Kreicker & Melan, Inc.	
Burgess-Sterbentz Corp.	64
Agency—Baldwin and Company	
Carl Mayer Corp.	53
Agency—Brad Wright Smith Advertising, Inc.	
Catalin Corporation of America	57
Agency—Walter J. Gallagher Adv.	
Christiansen Corp.	23
Agency—Marsteller, Rickard, Gebhardt and Reed, Inc.	
City Pattern Foundry & Machine Co.	21
Agency—Gray & Kilgore, Inc.	
Cleveland Flux Company	14
Agency—Brad Wright Smith Adv., Inc.	
The Cleveland Vibrator Co.	71
Agency—The Wellman-Buschman Co.	
Columbia-Geneva Steel Division	77
Agency—Batten, Barton, Durstine & Osborn, Inc.	
Delta Oil Products Co.	5
Agency—Cormack, Imse & Beaumont, Inc.	
The Dresser Industries	24
Agency—Rices, Dyke and Company	
Eastern Clay Products Dept.	19
Agency—C. Franklin Brown, Inc.	
Electro Metallurgical Co.	20
Agency—J. M. Mathes, Inc. Adv.	
Erie Strayer Co.	6
Agency—Mitchell Adv. Agency	
The Federal Foundry Supply Co.	1
Agency—Kasper Advertising	
Foundry Educational Foundation	62
Agency—The Wellman-Buschman Company	
Foundry Equipment Co.	26 & 27
Agency—Allied Advertising Agency, Inc.	
Geneva Works	77
Agency—Batten, Barton, Durstine & Osborn, Inc.	
Globe Steel Abrasive Co.	56
Agency—Colman Todd & Associates	
Hickman, Williams & Co., Inc.	15
Agency—Saas and Sogard, Inc.	
Holtzman Metal Co.	79
Agency—Milton Sharp, Adv.	
The Frank G. Hough Co.	10
Agency—Ervin R. Abramson, Adv.	
Hutchison Shell Mold Co.	55
Agency—Sales Engineering & Training	
The Industrial Press	67
International Minerals & Chemicals Corp.	19
Agency—C. Franklin Brown, Inc.	
Jeffrey Mfg. Co.	50
Agency—The Griswold-Eshleman Co.	
Keokuk Electro-Metals Co.	54
Agency—Waldie & Briggs, Inc.	
Lester B. Knight & Associates, Inc.	22
Agency—J. R. Pershall Co.	
R. Lavin & Sons, Inc.	70
Agency—Marvin L. Isaacson, Adv.	
Lectromelt Furnace Company	
Inside Front Cover	
Agency—The Griswold-Eshleman Co.	
Link-Belt Co.	9
Agency—Klau-Van Pietersom-Dunlap Assoc.	
Lithium Corporation of America, Inc.	25
Agency—Keystone Advertising, Inc.	

STEVENS

PARADE OF PROGRESS IN FOUNDRY PRODUCTS

Magnaflux Corporation	60
Agency—Stoetzel & Associates, Inc.	
Magnet Cove Barium Corp.	24
Agency—Rices, Dyke and Company	
Jas. A. Murphy & Co., Inc.	76
Agency—Clint Leap Inc.	
National Metal Abrasive Co.	15
Agency—Saas and Sogard, Inc.	
Ohio Crankshaft Co.	63
Agency—Carr Liggett Advertising, Inc.	
Oliver Machinery Co.	78
Agency—Webb J. Van Dyke Adv.	
Orefraction Inc.	16
Agency—Smith, Taylor & Jenkins, Inc.	
Pangborn Corp. Malleabrasive Div.	11
Agency—VanSant, Dugdale & Co., Inc.	
Pettibone Mulliken Corp.	17
Agency—Ladd, Southard & Bentley, Inc.	
Philadelphia Quartz Company	76
Agency—The Michener Company	
The Pipe Line Development Company	71
Agency—The W. N. Gates Co.	
Pittsburgh Crushed Steel Co.	56
Agency—Coleman Todd & Associates	
Reichhold Chemicals, Inc.	2
Agency—MacManus, John & Adams, Inc.	
Rothlan Corporation	75
Royer Foundry & Machine Co.	18
Agency—Advertising Producers—Associated, Inc.	
Claude B. Schneible Co.	66
Agency—Harold W. Jackson, Adv.	
Semet-Solvay Div.	
Allied Chemical & Dye Corp.	64
States Engineering Corp.	78
Frederic B. Stevens, Inc.	Inside Back Cover
Agency—Zarker Adv. Co.	
Syntro Co.	75
Agency—Servad, Inc.	
Thiem Products, Inc.	72
Agency—Ken Seitz & Associates, Inc.	
United States Steel Corporation	77
Agency—Batten, Barton, Durstine & Osborn, Inc.	
Vanadium Corp. of America	61
Agency—Hazard Advertising Company	
Vibron Division	64
Agency—Baldwin and Company	
Wedron Silica Co.	80
Agency—Armstrong Adv. Agency	
Wheelabrator Corp.	65
Agency—The Jaqua Co.	

This index is published as a convenience to the readers. While every care is taken to make it accurate MODERN CASTINGS assumes no responsibility for errors or omissions.



! Their money ran out before they finished the new plant.

CIRCLE NO. 171, PAGE 7-8

STEVENS
IGNICOAT X and S

New and different mold and core coatings for use with the CO₂ process. Can be sprayed, brushed or swabbed. Mixed with Isopropyl Alcohol, the coating will burn dry in 10 to 40 seconds.

STEVENS
RED SKIN CORE COATING

The core coating with automation built-in. When applied has No Runs • No Tears • No Build-Up.

STEVENS
GRAPH-KOTE CORE COATING

This graphite base core coating gives that much desired grey iron coloring. Designed for cores and molds used for grey iron, bronze and special alloys.

No run downs • tear drops • or build-up

STEVENS Improved FASTICK

Pasting of CO₂ cores is no longer a problem when Stevens Fastick Liquid Core Paste is used. Much less gas evolution than with powder type pastes. Will air dry and give an extremely strong joint.

STEVCO₂
CO₂ BINDER

Coats sand grains rapidly — minimum of mulling • Reacts quickly with Carbon Dioxide • Good flowability — Easy to handle • Produces smoother castings • Cores have long shelf life.

STEVENS
RED SKIN CORE COATING

The core coating with automation built-in. When applied has No Runs • No Tears • No Build-Up.

STEVENS PRODUCTS FOR THE CO₂ PROCESS

- Stevens Sand Conditioner
- Stevens Fastick Liquid Core Paste
- Stevens Slick-Seal Mudding Compound
- Stevens Kast Kleen Compound
- Stevens Stevco, CO₂ Binder
- Stevens Ignicoat X and S Core Coatings

STEVENS SUPER-Z ZIRCON COATING

Withstands highest metal pouring temperatures. Produces clean castings regardless of metal or size of casting.

For skin dried or dry sand molds, oil sand or cold set cores, and on CO₂ cores.

CLEAN — EASILY APPLIED

STEVENS
KLEEN-AIR DUSTLESS SEACOAL & PITCH

Improve working conditions with these treated products

NO DUST IN HANDLING • NON-TOXIC

STEVENS
STEVE-COAL

A ground, carbonized cellulose additive for molding sand. Contains in one package the combined effectiveness of wood flour and seacoal.

STEVENS
FOUNDRY FACINGS LABORATORY

In line with Stevens continuous testing and evaluating in their own laboratory, of new minerals and refractory compounds as possible bases for future foundry products, Stevens have also conducted tests in conjunction with Armour Research Foundation, Chicago. Some of the casting sections undergoing tests are shown.

WANT MORE INFORMATION ON ANY OF THESE PRODUCTS?

Contact your Stevens representative or write direct—Frederic B. Stevens, Inc., 1812 Eighteenth Street, Detroit 16, Mich.

FREDERIC B. STEVENS
INCORPORATED
EVERYTHING FOR A FOUNDRY
DETROIT 16, MICHIGAN

Increase Customer
Satisfaction
with

APEX PRODUCTS

ALUMINUM ALLOYS

for all types of castings

*ALUMINUM

for steel deoxidizing and grain control

**ALUMINUM BASE HARDENERS

for alloying and grain refining purposes

GRAINED ALUMINUM

for thermit reductions, steel metallurgy,
chemical applications, etc.

ALUMINUM FLUXES

for cleansing and grain refining all alloys

MAGNESIUM ALLOYS

for all types of castings

MAGNESIUM ANODES

for cathodic protection

ZINC ALLOYS

for die castings and metal forming dies

*Furnished in ingot, shot, piglet,
grained and special forms.

**Furnished in ingot and shot.

Spectrographic standards
Metallographic and X-Ray Examinations
Chemical Analytical methods
Physical and mechanical property tests
Chemical, spectrographic and quantometer analyses
Field Engineering

Technical Services

A practical, working knowledge of your problems . . . a superior product to meet them. These are the standards by which Apex Ingot is made . . . the reason why Foundrymen and Die Casters everywhere say, "It's best in every test from Ingot to Casting!"

APEX SMELTING COMPANY

Research leadership back of every Ingot

CHICAGO

CLEVELAND

LOS ANGELES

modern
castings

CIRCLE NO. 172, PAGE 7-8